FIELD CROP ABSTRACTS

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TRANSLATION*

MONOGERM SUGAR-BEET

BY

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For nearly 100 years consideration has been given to the question of the relation, in beet, between seed and fruit characters on the one hand, and desirable features in the root on the other. It has been claimed that the larger clusters give seeds from which plants with bigger roots are produced (8, 13, 15, 16, 18). More detailed studies (5, 9, 12, 14) have shown that, within the cluster, seed size and seed weight are uneven, depending on the time of flowering in the individual floret of the cluster. More robust seed is developed from florets which are the first to open and consequently, in the aggregate, smaller seed predominates. The following Table 1 is cited from Orlovskiĭ (10) :

TABLE 1

Seeds in cluster :	1st	2nd	3rd	4th	5th
Cluster	Seed weight (mg.)				
1	9·3	7·0	6·9	5·0	4·1
2	7·6	3·9	3·9	3·7	—
3	6·7	2·9	0·5	—	—

From a study of root size in plants grown from different seeds in a single cluster, Kolomiec (7) obtained the data shown in Table 2.

TABLE 2

Weight of a single seed (mg.)	5·2	4·0	3·1	2·0	1·5
Root weight (g.)	503	423	326	270	150

There is, further, a more striking difference in the weights of roots of plants grown from the seeds of one cluster which have been sown in a single pocket, without subsequent thinning (nutrition area of the cluster = 45·5 × 44·5 cm.). This is shown by Rytelj (12) in Table 3.

TABLE 3

Root no.	1	2	3	4	5	6	7
Pocket	Root weight (g.)						
1	157	33	20	7·6	1·7	0·8	0·3
2	138	44	28	9·1	1·3	0·7	—
3	106	61	17	11	2·5	—	—

With the simultaneous germination of several seeds from one cluster, seedlings may become intertwined, and, when the growth of seedlings from the usual multiple-germ beet is dense and thinning is delayed, root yields and sugar content are lowered. Furthermore, even when the plants are carefully thinned, the seedlings from one cluster may be unsound and contaminate the root system of neighbouring plants, thereby leading to reduced yields or even crop failure. When dense sowings are thinned by hand, the weaker plants from the less robust seed may be left and the more vigorous specimens removed (as these are more easy to grasp and lift). However, when a seedling grows from a monogerm fruit, there is no dense growth or intertwining of seedlings. Thinning and the selection of better specimens are thus facilitated in a way not possible with plants from multiple-germ clusters.

The attention of breeders and biologists has repeatedly turned to the question of obtaining sugar-beet bearing single-germ fruits. The contention that in such work the breeders " go against nature " is not tenable. On the contrary, the possibility of success is supported by the fact that there are single-flowered forms in five species of wild beets, namely, *webbiana*, *procumbens*, *patellaris*, *lomatogona*, *nana* (6).

The selection of sugar-beet for monogerm fruits was studied in the USA during 1903–13 but a constant monogerm form was not obtained (in 3 of the best selections the monogerm character was not greater than 75%). This American work was curtailed, but after the second world war the study of monogerm fruits was again started in the USA, and also in Germany, Hungary and other countries, but, judging from the literature, there are still no monogerm forms available for sowing. The French breeder Margara, who studied a monogerm beet from the USA designated SLC 101, gave it the following adverse character : " The line of monogerm seed under our observations in Versailles has no value as a crop. The unhealthy plants are more prone to yellowing than the normal sugar-beet, and the roots are insignificant in appearance " (17).

In the USSR, work on monogerm seed began in 1932. Kolomiec (7), working in 1932 at the

*Translation from Russian in *Doklady Vsesojuz. Akad. SH Nauk*, 1957, **22**, No. 3, 7-13, bibl. 18.

All-Union Institute of Sugar-beet, discovered among sowings at the Verhnjačsk Selection Station one plant with some monogerm fruits. By pollinations between the progeny of this selected monogerm material she obtained in 1936 one specimen of beet completely monogerm in character. To improve the productivity of this monogerm beet, Kolomiec crossed it with the best Verhnjačsk and Ramonsk varieties of normal sugar-beet, and endeavoured, by subsequent selection, to strengthen the monogerm feature.

In 1933 Grinjko (4), working with self-pollinated lines of beet, developed two monogerm plants at the Ivanovsk Station. One had 94% monogerm fruits and the second 86%. The first generation inbreds from these had 44–90% of monogerm fruits. The hybrids obtained by Grinjko as a result of crossing monogerm lines with multiple-germ beet gave 2-seeded progeny in the first generation.

In 1934, workers at the All-Union Institute of Sugar-beet and at ten experimental Selection Stations studied 1023 hectares of sugar-beet plantings, located at the Stations and on State farms. Among 22 million plants there were 109 with a more or less monogerm character (from 10 to 90%), but a completely monogerm plant was not found. The first generations from the 109 plants, obtained at the All-Union Institute and at some of the Selection Stations, were mostly multiple-germ forms. Thus the monogerm feature is recessive. This has been confirmed also by Bordonos (1, 2), Kolomiec (7) and others (4). However, recent observations have shown that the multiple-germ character is not entirely dominant. On the other hand, when monogerm plants of different origin are crossed, in the progeny there are unexpected multiple-germ forms.

Up to the beginning of World War II, work on monogerm beet was carried out at the All-Union Institute of Sugar-beet (Bordonos), in the Nemerčansk Station and Jaltuškovsk Centre (Fedorovič) and in the Belocerkovsk Agricultural Institute (Kolomiec). This work was curtailed during the war, but was continued again in 1944–5 (3), and expanded on a wider scale during 1946–7. At present the Belocerkovsk Selection Station (Kolomiec) and the Jaltuškovsk Centre (Popov) have changed over completely to work on monogerm fruits. Initial work is also in progress at the Biisk, Ramonsk, Verhnjačsk and Ljgovsk Selection Stations, in addition to the Litovsk Scientific Research Institute for Agriculture.

In the initial period of selection studies, monogerm beet was distinguished by low seed production, late-ripening and low root-yields. According to Popov (11) monogerm beet, even 8–10 years ago, gave root harvests and sugar yields 20–30%/ha. below that of the regional commercial varieties. It is believed that hybridization of monogerm types with commercial varieties of normal sugar-beet, followed by selection, is the means of obtaining monogerm types of value equal to that of normal sugar-beet.

For breeding material there has been used replicated, systematic (preferably individual) selection for the following characters ; monogerm fruits ; early ripening ; non-lodging, seed-producing plants ; large seed and vigorous growth; good yields of root and high sugar-content ; resistance to disease and bolting.

In monogerm beets there is a close relation between fruit size and seed weight, as shown by the data (7), in Table 4.

TABLE 4

Diameter of fruits (sieves with round apertures) (mm.)	6	5	4	3·5
Weight of 1000 fruits (g.)	31·5	21·8	15·0	10·8
„ „ 1000 seeds (g.)	6·2	5·4	4·0	3·6

There is also a direct relation between size of the fruit, seedling size and beet yield (Table 5).

TABLE 5

Diameter of fruits in round apertures	Weight of 1000 fruits	Weight of 100 seedlings	Root yield	Sugar	Sugar yield
(mm.)	(g.)	(g.)	(kg./ha.)	(%)	(kg./ha.)
6	20·2	2·49	41,600	17·3	7180
5	17·2	2·94	36,300	17·9	6480
4	17·2	2·18	36,300	17·1	6220
3	7·4	1·42	34,800	16·2	5640

Even simple grading by sieves may be an effective means of selecting the more productive seed of monogerm beet.

Great importance is given to the specific lightness (" winged-ness ") of the fruits which is conditioned chiefly by the weight of seed in the fruit (as distinct from weight of the husks). Research at the All-Union Institute of Sugar-beet and the Belocerkovsk Station has shown that the heavier clusters (under almost uniform conditions) produce higher root-weight. The relation between specific lightness of the fruits and root weight in monogerm beet has been confirmed by Bordonos (2) (Table 6).

Combining hybridization with selection for fruit- and root-weight, sugar content and other agricultural and biological features, leads in a comparatively short time to a significant increase in productivity of monogerm beet. This is shown by the percentage amount of monogerm fruits

TABLE 6

Diameter of fruits	Difference in specific lightness of fruits	Average weight of root	Weight of root as % of the standard (I 1305)
(mm.)		(g.)	
4·0	heavy	550	115
4·0	light	520	109
3·5	heavy	559	116
3·5	light	475	99
3·0	heavy	396	83
3·0	light	380	79
2·5	heavy	414	86
2·5	light	364	76

which surpass the standard normal beets of the Jaltuškovsk Selection Centre (Popov) (Table 7).

were several plants which exceeded the best known varieties P 06, B 020, etc. by 4–6%, in sugar yield. However, the chief advantage of monogerm beet is that in cultural measures there is less expenditure of labour compared with normal beet. Moreover,

TABLE 8

Variety	Root yield	Sugar	Sugar yield
	(kg./ha.)	(%)	(kg./ha.)
Jaltuškovskaja odnosemjannaja P56-555	42,100	18·1	7620
Raionirovannyĭ Ja 02	40,000	18·1	7240
Ramonskiĭ P 06	40,500	18·0	7200

the wider the separation of the monogerm plants within rows, the less is the decline in yields when thinning is withheld. For example, data covering 2 years from the Jaltuškovsk Centre, show that yields from normal beet (about 33,000 kg./ha.) are

TABLE 7

Year	No. of plants investigated	Percentage numbers above the standard in root yield	in % sugar	in sugar yield	in yield and % sugar simultaneously	Denomination of standard variety
1947	40	0	95	0	0	I 1305
1949	68	2	82	2	0	I 1305
1951	119	2	64	1	1	P 632
1953	114	10	26	12	7	P 632
1955	123	18	86	33	29	P 06

Thus, at the beginning of the post-war period, there were few monogerm beets which exceeded in sugar yield the standard at that time (I 1305), but in 1955 there were more than 30% which exceeded the more productive P 06 in both sugar yield and sugar content. This is also true for the number of monogerm beets at the Belocerkovsk Station, not only in the Station trials but also in those of the regional and State tests. In the State varietal trials during 1955, the sugar-beet variety "Belocerkovskaja odnosemjannaja" was assigned to the Zgurovsk region, Kiev Province. In 1956 this variety was confirmed for the Zgurovsk region on the basis of its sugar yield which resembled the normal beet B 020 of that area. In 1956 also, the Belocerkovskaja monogerm variety was assigned to the Kozansk plots, Kiev Province. The best new varieties of monogerm beet in varietal trials at Nemerčansk during 1956 were evaluated higher than the regional varieties, notably P 06 (Table 8).

According to the 1955–6 trials at the Belocerkovsk Station and the Jaltuškovsk Centre, there

lowered by delaying thinning for 12–15 days by 4100 kg./ha. but with monogerm beet the amount was only 1700 kg./ha.

Along with varietal trials at Research Stations, monogerm beet has been studied under production conditions in beet State farms (of the Varietal Seed Trust, MSH, USSR). Results of this production experiment carried out on an area of 200 ha. in 10 State farms (an average for 2 years) are shown in Table 9.

TABLE 9

Variant	Root yield	Sugar	Sugar yield	Expenditure of labour in thinning
	(kg./ha.)	(%)	(kg./ha.)	(man-days)
Monogerm	23,800	18·7	4420	12·4
Multiple-germ	24,700	18·6	4570	14·0

Sugar yield and percentage content are similar in the beet from the two types of fruit but it is important to note that the labour involved in

thinning monogerm beet is much lower in spite of the uniform sowing norm (35 kg./ha.). From a series of tests the saving in labour is estimated as 15 or 20%. Many such tests have been carried out by the All-Union Sugar-beet Institute. Results of one trial from the Jaltuškovsk Centre (3-year average) with a sowing norm of 20 kg./ha. are shown in Table 10.

TABLE 10

Variant	Root yield: Hand thinning to 18 cm. (kg./ha.)	Root yield: Blocking to 18 cm. without thinning (kg./ha.)	Difference (kg./ha.)	Difference (%)
Normal beet	27,200	21,100	−6100	−23
Monogerm beet	25,700	22,300	−3400	−13

In production trials (during 1955 at the Jaltuškovsk Sugar Combine) with a sowing rate of 20 kg./ha. and preliminary blocking with cross cultivation at 44·5 cm. (length of block 10 cm.), yield of roots from monogerm beet was 30,300 kg./ha.

Study is being continued of monogerm beet and the possibility of its further improvement (increase in seed size, vigour of growth, and general productivity) but the main requisites include a complete mechanization of cultivation processes for monogerm beet, and already measures are being taken to accelerate its development to such a degree that by 1959–60 it is anticipated that 100,000 ha. of productive monogerm sowings will be made.

The problem is thus to multiply monogerm beet while increasing its yields. The breeding stations and beet State farms charged with the multiplication of monogerm beet need to raise the level of work on seed production; that is, to increase seed yield, improve the technique for planting mother-beets, and increase the production of elite seed.

SUMMARY

The first regionalized monogerm sugar-beet has been produced in the USSR. It has been bred from a selection of individual sowings of normal sugar-beet characterized by the presence of monogerm fruits. The bred forms of monogerm beet are distinguished by low root-yields and low seed-production. An increase in productivity of monogerm beet and early ripening of the sowings are achieved by hybridization of monogerm beet with the best multiple-germ varieties, and selecting systematically for a complex of features (good yields, sugar content, mono-seededness, early ripening, resistance to disease, bolting, etc.). The best monogerm beets resemble the regionalized varieties of normal beets in regard to productivity. Because of the more scattered distribution of beet plants within rows when monogerm seed is sown, there is less intertwining; thus the work of thinning and cross-blocking is lessened (by 15–20% or more). Monogerm beet is therefore more promising material for mechanized cultivation; furthermore, since the selection of larger and better growth is facilitated, there is a general increase in sugar-beet productivity.

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(3) Buzanov, I. F. and Orlovskiĭ, N. I. 1946. [Monogerm sugar-beet.] *Saharnaja Promyšlennostj* No. 3. Moscow.
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(10) ———— 1952. [Fundamental biology of the sugar-beet.] Kiev.
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(15) Knauer, F. 1885. [Beet seed.] Vienna.
(16) Marek, G. 1875. [Seed quality and its effect on yields.] Vienna.
(17) Margara, — 1954. [Improvement measures for sugar-beet.] *Ann. Amelior. Plantes I.N.R.A.* No. 2.
(18) Stenlik, — 1930. [Effect of selection for the monogerm character in beet plants on their further development.] *Sborn. Csl. Akad. Zemled.* 2.

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FIELD CROPS

CEREALS

WHEAT

1257 FAJERSSON, F. Bestockningsförmågan hos några höstvetesorter vid mindre och större plantavstand. **[Tillering capacity of some winter-wheat varieties in relation to spacing between plants.]** *Agri. hort. genet., Landskrona* 1957, **15**, No. 1–2, 98–103, bibl. 7, English and German summaries.

Ten Swedish wheat varieties were investigated for 5 years with regard to tillering capacity and reaction to increased space per plant. The distances between plants were 8 × 12·5 cm. and 25 × 25 cm. Tillering was found to be strongly influenced by hereditary factors and by spacing. Within varieties, significant differences were found as regards both tillering capacity and reaction to increased space. The average numbers of tillers per plant were : Eroica 5·4 (close spacing) and 19·4 (increased spacing) and for Skandia III 4·2 and 16·0, respectively. Skandia showed the greatest response to increased spacing but did not produce as many tillers as did Eroica.—J.K.L.

1258 MALTERRE, H. and FIORAMONTI, S. Influence de deux caractéristiques du milieu sol-climat sur la productivité des blés en Haute-Garonne. **[The effect of two factors in the soil-climate environment on the productivity of wheat in Haute-Garonne (France).]** *C.R. Acad. Agric. Fr.* 1957, **43**, No. 4, 199–202. [Sta. Agron., Toulouse]

This is a study of the influence of natural soil fertility and winter rainfall on the yields of autumn wheat grown over 7 years in the river alluvial soils of the Toulouse region. Although this region has a dry climate, it was found that increased winter rainfall depressed yields considerably. This conclusion was drawn by comparing yields obtained in years in which the rainfall in Dec.–Feb. was less than 150 mm. with those in which it was more than 200 mm. and by considering separately the yields obtained on deep clay soils and those on shallow flinty soils.—E.B.O.

1259† STEIKHARDT. Ist Grünfutterzwischennutzung im Frühjahr bei Wintergetreide ratsam? **[Is a spring cut of winter cereals for fodder advisable ?]** *Dtsch. Landw.* 1957, **8**, No. 4, 195–7, bibl. 6. [Inst. Landw. Versuchs- u. Untersuchwes., Jena, E. Germany]

From tabulated results it is clear that cutting winter-rye and winter-wheat in May and June for green fodder resulted in lower yields of grain and straw, and delayed ripening. Comparing the total yields of nutrients obtained with and without the cut for fodder, the former gave an increase in crude protein but a decrease in starch equivalent. Fodder shortage or a danger of lodging are the only situations in which the cereal crop should be cut green.—D.B.

1260 SILVA, F. de. En torno a la renovación de simientes de plantas de gran cultivo. **[A change of seed for field crops.]** *Agricultura, Madr.* 1956, **25**, No. 292, 470–3, illus.

Information is given on the performance in Spain of several wheat varieties introduced from abroad. Of those varieties from the Centro de Cerealicultura of Madrid, Aradi, Canaleja and Canti have been successfully grown in Old and New Castile. Of the barley varieties from this Centre, Cerro is suitable for Andalusia where it yielded up to 50% more than the control varieties.—E.B.O.

1261 MONTANARI, V. La granicoltura italiana nella campagna 1955–56. **[Wheat cultivation in Italy in 1955-6.]** *Ital. agric.* 1956, **93**, No. 10, 735–56, illus.

A table shows the most important varieties (*Triticum vulgare* and *T. durum*), their area of cultivation and average yields per unit area. The most widely grown was S. Pastore (629,200 ha.), which yielded an average of 2840 kg. per ha., followed by Funo (395,000 ha.) with 2310 kg. and Mara (287,700 ha.) with 3210 kg. per ha. Other high-yielding varieties were Damiano Chiesa (3331 kg.), Fortunato (3079 kg.) and R.37 (2989 kg. per ha.). —E.B.O.

1262 MINISTER OF AGRICULTURE, CANADA. **Selkirk spring-wheat.** *Rep. Minist. Agric. 1955–6*, 1956, 86.

There was a rapid increase during 1955 in the use of Selkirk spring-wheat in the rust areas of Manitoba and Saskatchewan ; in Manitoba the increase from 1954 to 1955 was from 3 to 64%. This wheat was also satisfactory on the irrigated lands of southern Alberta.—D.B.

1263 AGRICULTURA TROPICAL, BOGOTÁ. La campaña de multiplicación de semillas de trigo del Fondo Rotatorio de Fomento Económico. **[Wheat seed multiplication by the Fondo Rotatorio de Fomento Económico (Colombia).]** *Agric. trop., Bogotá* 1956, **12**, No. 12, 808–12, illus.

With the exception of some places in the northern

savannah where low temperatures occur and for which the wheat variety Menkemén is recommended, the variety Bonza yielded well in Colombia in 1956, its average yield on 1608 ha. being 2291 kg. of grain per ha.—E.B.O.

1264 Fox, R. L. and Albrecht, W. A. **Soil fertility and the quality of seeds.** *Res. Bull. 619 Missouri Agric. Exp. Sta.* 1957, pp. 23, bibl. 13, illus.

Seed was harvested from wheat grown under varying levels of applied nutrients on a range of soils, and was tested for germination and seedling vigour. Moderate amounts of P improved seedling emergence but large quantities depressed it. Seed from plants fertilized with trace elements and large quantities of major nutrients often gave the least vigorous seedlings. N-fertilization increased the N content and decreased the P content of seed and embryo ; higher N-rates decreased the size of seed and embryo.—From authors' summary.

1265 Carter, H. W. and others. **Wheat and cheat.** *Agron. J.* 1957, **49**, No. 5, 261–7, bibl. 14, illus. [Illinois Agric. Exp. Sta.]

Cheat (*Bromus secalinus*) was weakly competitive when grown in a dense wheat stand. In thin wheat stands, it tillered profusely and produced abundant seed. It was concluded that seed production of cheat, though never entirely prevented, can be reduced sufficiently by thick and uniform stands of wheat to afford effective control.—From authors' summary.

1266 Anderson, L. E. (Summarizer). **Winter wheat [weed control in].** [2 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 90. [Texas] [Received April, 1957]

Autumn applications of 2,4-D to winter wheat, var. Concho, delayed maturity at all rates (0·5–2 lb./ac.) and at all stages of growth, but yield was not reduced by treatment at the 2- to 3-tiller stage. Ester formulations delayed maturity by 1 day and reduced the yield by 1 bu./ac. more than did the amine.—From summary.

1267 Machacek, J. E. **Co-operative seed treatment trials – 1956.** *Pl. Dis. Reptr* 1957, **41**, No. 4, 317–23. [Pl. Path. Lab., Winnipeg]

Tests with 17 new seed-dressings, mainly fungicide/insecticide combinations, showed that most of the dressings were effective against wheat bunt (*Tilletia foetida* and *T. caries*) and fewer against oat smut (*Ustilago avenae* and *U. kolleri*) and barley smut (*U. hordei*). Canuck organic mercury SD was the best among several products which gave good control of flax-seed rot. Tests for phytotoxicity showed that storage of the treated seed for 4 months was, with most dressings, injurious to wheat, injurious in many cases to flax and in a few cases to oats and barley.—J.F.C.

1268 Purdy, L. H. **Does post-treatment storage of wheat seed increase the effectiveness of fungicides against smut ?** *Pl. Dis. Reptr* 1956, **40**, No. 10, 878–81, bibl. 2. [Agric. Res. Serv., USDA, Agric. Exp. Sta., Idaho, Oregon and Washington]

Good control of smut [*Tilletia* spp.] was obtained with anticarie, agrox, ceresan M and panogen 15 applied to seed of autumn-sown Elgin wheat ; post-treatment storage caused little or no increase in the effectiveness of the fungicides.—J.F.C.

1269 Laumont, P. and others. Note sur les blés durs lavés. [**Note on weather-damaged durum wheats.**] *Élev. et Cult.* 1956, No. 90, pp. 15, illus. [Sta. Cent. Essais Sem. et Amélior. Plantes, Maison-Carrée, Algiers]

Information is given on the damage caused to wheat in Algeria by spring rains during the last stage of ripening. The affected grains are distinguishable from sound grains by their opacity and lighter colour. The early varieties are more susceptible than the late ones, and the crops grown in littoral and low-lying areas more than those grown on high lands. The damage " blés lavés " is taken into account in fixing the price of wheat. —E.B.O.

1270 Ekdahl, I. **The effects of indole-3-acetic acid and 2,4-dichlorophenoxyacetic acid on the elongation rate of root hairs and roots of intact wheat seedlings.** *Physiol. Plant.* 1957, **10**, No. 1, 112–26, bibl. 28, illus. [Inst. Plant Physiol., Royal Agric. College, Uppsala, Sweden]

1271 Rufelt, H. **The course of the geotropic reaction of wheat roots.** *Physiol. Plant.* 1957, **10**, No. 1, 231–47, bibl. 28, illus. [Botanical Laboratory, Lund, Sweden]

1272 Kutáček, M. and others. O kořenových exkretech 2. Pohyb radioaktivního P^{32} v rostlinách pšenice při jejich pěstování metodou dělené výživy. **On root exudations 2. The movements of radioactive P^{32} in wheat plants grown by means of the method of sectional nutrition.** *Ann. čsl. Acad. agric. Sci., Pl. Prod. Ser.* 1956, **29**, No. 6, 525-36, bibl. 25, illus., Russian and English summaries. [Agric. Sch., Prague]

The movement of ^{32}P in wheat plants was observed on the 7th–8th day after germination. Knop's solution was used as a nutrient source,

$Na_2H^{32}PO_4$ being added to one part of the roots. After 20 hours, ^{32}P was excreted from roots growing in the non-radio-active solution. It was concluded that the roots were metabolically interconnected through the aerial part of the plant.—From authors' summary.

1273 Iljinskaja-Centilovič, M. A. and Gurjev, B. P. [**Peculiarities of the stem-formation process in winter wheat varieties in relation to lodging.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1957, **113,** No. 1, 217–9, bibl. 5. [Dokučaev Agric. Inst., Harjkov]

This work was carried out with the following winter wheat varieties : Odesskaja 3 (a type highly susceptible to lodging), Lutescens 266 (showing a medium amount of lodging) and Lutescens 238 (showing a slight amount of lodging). The tests were made on an experimental field of the above Institute and fertilizers were applied as follows : (1) 60 kg. sulphate of ammonia/ha., and (2) 45 kg. PK/ha. ; the plots being sown at the normal seed rate. In addition, sowings at half the norm were made on plots with no supplementary fertilizers. Plot size was 50 m.^{2} and replication three-fold. Observations made at the stooling, earing and fully-ripe stages show that : (a) lodging in all varieties occurs in greatest amount at the fully-ripe stage, especially in Odesskaja 3 and Lutescens 266 ; (b) N fertilizer lowers stem stability ; (c) sowing with half the seed norm helps to prevent lodging by allowing greater illumination to the lower internodes ; resistance to lodging is related to the stability of the second above-ground internode ; and (d) the thickness of the ring of mechanical tissue [hypoderm] varies with growth conditions but there is apparently little varietal difference in this structure at the stooling phase. Noticeable differences in the thickness of this ring are shown by varieties at the earing phase and are pronounced at full ripening (83·2μ in Lutescens 238 with PK, and 66·7μ in Odesskaja 3). Stem stability is also affected by the quantity of vascular bundles ; these are more numerous in varieties not susceptible to lodging. It is concluded that in breeding varieties for lodging resistance, the dynamics of structural features should be considered.—M.H.

1274 Shimizu, M. **The effect of the low temperature treatment on the structure of the shoot apex and leaf in the wheat plant.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1956, **25,** No. 2, 90–2, illus., English summary. [Fac. Agric., Nagoya Univ.]

A histological examination of the above tissues revealed that low-temperature treatment (3°C. for 40 days) of wheat seed accelerated growth and development of the young plant by promoting meristematic activity. Compared with control plants this resulted in : a more rapid differentiation of zones in the apex ; larger apex and leaf blades as a result of more rapid cell division ; and an accelerated differentiation of stomatal cells, vascular and mechanical tissue.—From English summary.—D.B.

1275 Czinj-Anj, Č. and others. [**Morphology and development of the ear in branched wheat.**] [Chinese] *Acta Botanica Sinica* 1956, **5,** No. 1, 49–54, bibl. 10, illus., Russian summary.

1276 Mathon, C-C. and Stroun, M. Intensité lumineuse et fertilité chez les céréales. [**Relationship between light intensity and fertility in cereals.**] *Bull. Soc. bot. Fr.* 1956, **103,** No. 5/6, 247–50, bibl. in text.

In preliminary trials, it was shown that in the wheat varieties Roussia and Pio a period existed, more or less succeeding the photostage, in which a decrease in light intensity brought about a significant reduction in fertility. The number of grains in the ears set was reduced by as much as 66% compared with the controls ; and this reduction was greatest in the spikelets in the upper half of the ears.—M.P.

1277 Guljakin, I. V. and Judinceva, E. V. [**The uptake by plants of the products of fission and their effect on the plant organism.**] [Russian] *Izv. Timirjazevsk. seljsk. Akad.* (*Bull. Timirjazev agric. Acad.*) 1956, No. 3, (13), 121–42, bibl. 11, illus.

The work is concerned with the uptake by *Triticum persicum* of the radio-active isotopes of strontium, caesium, cerium, ruthenium and zirconium at different phases of plant growth (end of tillering, end of stooling) in culture solution and in a medium argillaceous soil. There is evidence that radio-active Sr, in contrast to the other elements, accumulates in considerable quantities in the grain, whether the plants are grown in culture solution or in the soil. In addition, the translocation of some fission products in sunflower and bean plants (when the elements are applied through the leaves) has been studied and there is information on the damaging effect of radio-active fission products on wheat and oat plants.—M.H.

1278 Gunthardt, H. and McGinnis, J. **Effect of nitrogen fertilization on amino acids in whole wheat.** *J. Nutr.* 1957, **61,** No. 2, 167–76, bibl. 13. [Dep. Agron., Poultry Sci., State Coll. Wash., Pullman]

High-protein wheat samples contained less lysine (as percentage of crude-protein) than low-protein samples. The lower lysine content of crude

protein resulted when N-applications were made as late as the boot, flowering or milk stages. Great increases in the protein content of wheat were produced by N-application with, apart from lysine, only slight differences in the amino-acid percentages of the total crude-protein being observed.—From authors' summary.

1279 Silvela, F. and Salto, M. Estudio experimental de las " creces" que se producen en el trigo almacenado por efecto de las variaciones que naturalmente se originan en la humedad ambiente desde la época de la recolección del grano hasta el momento de su salida del granero para consumo. [**An experimental study on the increases which occur in stored wheat because of the natural changes in the humidity of the environment from harvest to the time the wheat is taken from the granary for consumption.**] *Bol. Inst. nac. Invest. agron.* 1956, **16,** No. 35, 239–53, illus., English and French summaries.

1280 Gallo, G. La conservazione del grano nei magazzini aziendali. [**The storage of wheat in farm warehouses.**] *Ital. agric.* 1956, **93,** No. 8, 607–18, illus.

OATS

1281 Minister of Agriculture, Canada. **Oat varieties.** *Rep. Minist. Agric. 1955–6,* 1956, 86–7.

Rodney and Garry oats showed wide adaptability. They are in demand in the rust areas of Western Canada, in Ontario, Quebec, and the north-central and north-eastern regions of the United States. The cultivation of Abegweit has spread rapidly in New Brunswick and it is recommended for parts of Quebec and, provisionally, for the Peace River area of Alberta. Scotian has shown adaptability and given good yields in Eastern Canada outside the province of Nova Scotia where it originated. Vicar, a new, late-maturing, hull-less variety was licensed for sale in Canada ; it has excellent resistance to rusts and smut diseases, has strong straw and gives good yields. Clintland is replacing Clinton in southern and southwestern Ontario ; it gives higher yields and has greater resistance to crown rust than Clinton.—D.B.

1282 Gliemeroth, G. Untersuchungen über Ausbildung und Leistung der Keim- und Kronenwurzeln bei Sommergetreide. [**Development and function of seminal and crown roots in spring cereals.**] *Z. Acker- und Pflbau* 1957, **103,** No. 1, 1–21, illus.

Since observations during previous investigations had contradicted much of the text-book teaching on the longevity and functions of the seminal and crown roots of cereals, pot and field experiments were conducted with oats and spring-barley to determine separately the quantity, distribution and functional importance of seminal and crown roots. In these experiments, the seminal roots of spring-barley growing in sand or in clay, reached a depth of 60 cm. (the bottom of the pot) before there was any noticeable development of crown roots. The crown roots remained short in the upper layers and only occasionally penetrated below 20 cm. In the field experiments, the development of crown roots, growing in deep clay, appeared to be strongly influenced by environment, but in no case was there any marked superiority of crown roots over seminal roots. The crown roots spread in the upper, friable layer of soil and the seminal roots penetrated to a depth of 120 cm. or more. In general, the crown root-system of oats was stronger than that of barley. That the seminal roots were capable of supplying the plants with sufficient nutrients for flowering and maturity was demonstrated by cutting off the crown roots as they appeared. In spite of such drastic treatment, the yields from plants deprived of crown roots were only slightly lower than those on which crown and seminal roots remained intact. On investigating the function of respiration in the two types of root, plants with seminal roots only had a much higher respiration quotient than those with crown roots only.—D.B.

1283 van Leishout, J. W. De wortelonwikkeling van haver in Jeugdstadium bij verschillende vocht- en voedingstoestand van de grond. **Early root development of oats in relation to moisture and nutrient conditions of the soil.** *Landbouwk. Tijdschr.* 1957, **69,** No. 4, 317–25, bibl. 22, illus., English summary.

A split-root experiment was conducted, in pots divided into two equal parts by a vertical glass plate, to investigate the effect of the moisture and nutrient status of the soil on the early root-development of oats. There were four moisture levels, namely, 20, 40, 60 and 80% of the water-holding capacity of the soil, and three nutrients levels : O, normal and double amounts of NPK fertilizers. The root weight was greatest at the 40% moisture level, whereas the shoot weight increased gradually especially at the double nutrient level. Fertilizing half a pot increased the root development in the O-level half. The shoot/root ratio increased with increasing moisture content of the soil, as did water consumption per unit of root weight. On the other hand, the production of dry matter per unit of water consumed slightly decreased at high moisture level. Fertilizing did not involve a smaller

proportional evaporation. High fertilizer rates give good returns only when the soil-water supply is favourable, but then there is vigorous early root-development which is very important for the further growth and yield of the crop.—Author's summary.

1284 Wiggans, S. C. and Frey, K. J. **Tillering studies in oats. 2. Effect of photoperiod and date of planting.** *Agron. J.* 1957, **49**, No. 4, 215–7, bibl. 9, illus. [Iowa Agric. Exp. Sta., Ames]

All the oat varieties tested required more than 12 hr. of continuous light or 9 hr. daylight and 1 hr. of light at midnight, to produce heads within 90 days. Plants grown at 58°F. required 4–9 days longer for heading than those grown at 70°F. The number of heads per plant decreased with an increase in sowing rate, but increased when sowing was deferred from early April until early May and decreased with further deferment. [See *Fld Crop Abstr.* 9 : 43 and 717.]—From authors' summary.

1285 Seo, Y. **The effect of magnesium deficiency on the plant growth. 2. Contents of several forms of magnesium and calcium in leaf and stem of oat plant.** [Japanese] *Bull. Fac. Agric., Univ. Miyazaki* 1957, **2**, Nos. 1–2, 91–5, bibl. 9, English summary.

1286 Jones, L. H. P. **The effect of liming a neutral soil on the uptake of manganese by [oat] plants.** *Plant and Soil* 1957, **8**, No. 4, 301–14, bibl. 12, illus. [CSIRO, Div. Pl. Ind., Univ. Melbourne]

1287 West of Scotland Agricultural College. **Oat costings, 1955 crop. Averages for 28 binder-cut crops.** *Rep. 37 W. Scot. Agric. Coll. Econ. Dep.* 1957, pp. 6 + viii.

BARLEY

1288 Pérez-Navarro, A. Memoria de los trabajos realizados por la sección de cebadas y avenas del Centro de Cerealicultura de Madrid en el año 1955. [**Report on the work carried out at the barley and oat section of the Centro de Cerealicultura of Madrid in 1955.**] *An. Inst. nac. Invest. agron.* 1956, **5**, No. 3, 447–595.

Results are given of the multiplication of the most promising varieties of barley and oats on irrigated and non-irrigated land in Spain, and of comparative yield trials with barley and oat varieties in different regions.—E.B.O.

1289 Erroux, J. Les orges du Fezzan. [**The barleys of the Fezzan.**] *Bull. Soc. Hist. nat. Afr. N.* 1956, **47**, 74–83, bibl. 17, illus.

[See also *Fld Crop Abstr.* 8 : 374.]

1290 Minister of Agriculture, Canada. **Barley varieties.** *Rep. Minist. Agric. 1955–6*, 1956, 87–8.

The new malting variety, Parkland, which is smooth-awned, rust-resistant, high yielding and widely adapted, has been licensed. Compared with Montcalm it is equal in malting quality and superior in yield and strength of straw. The Swedish 2-rowed variety, Herta, has yielded particularly well in Manitoba ; it has good straw and does not shatter. It is not a malting barley in Canada.—D.B.

1291 Friesen, H. A. (Summarizer). **Tartary buckwheat.** [3 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee 1956*, 65–7. [Alberta]

Complete kill of *Fagopyrum tataricum* in barley was obtained with neburon at 5·4, 7·2 and 10·8 lb./ac. applied at the cotyledonary or the early flowering stages. The barley was not noticeably affected. Low-volatile 2,4-D esters were also of promise for suppressing the growth of *F. tataricum*, and superior to 2,4-D and MCPA (butyl esters).—From summary.

1292 Machacek, J. E. and Wallace, H. A. H. **A study of the germination of barley seed treated to control loose smut.** *Canad. J. Pl. Sci.* 1957, **37**, No. 1, 59–68, bibl. 13. [Plant Path. Lab., Winnipeg, Manitoba]

Tests of barley seed treated by the water-soak and the spergon method to control loose smut (*Ustilago nuda*) have shown that both treatments reduce germination, the spergon treatment being the more injurious of the two. A part of the reduction may be due to an induced dormancy, but usually the ungerminated seeds are dead. Varieties of barley vary greatly in susceptibility to injury from treatment, but an equally great variation may occur among different lots of seed of the same variety. Susceptibility to the water-soak treatment is closely correlated with susceptibility to the spergon treatment. Treatment with ceresan M improves germination and there is a correlation between improvement by this treatment and reduction in germination caused by the water-soak or the spergon treatment. Treatment of barley seed by the water-soak and spergon methods destroys a part of the *Alternaria* contaminant usually present in such seed, but has less effect on it than ceresan M. Treatment of the seed by the anaerobic-incubation method as used in this study had scarcely any suppressive effect on *Alternaria*.—Authors' abstract.

1293 Williams, D. E. and Vlamis, J. **Manganese and boron toxicities in standard culture solutions.** *Proc. Soil Sci. Soc. Amer.* 1957, **21,** No. 2, 205–9, bibl. 15, illus. [Dep. Soils, Pl. Nutr., Univ. California, Berkeley]

Barley plants grown in standard Hoagland solutions (containing 0·5 ppm. each of B and Mn) developed dark-brown spots on the older leaves. A decrease in yield and an increase in spotting were associated with an increase in the Mn and B concentrations. An increase in the concentrations of Ca, Mg, and K reduced the Mn content of the leaves and repressed or prevented the appearance of spots due to Mn or B. Barley plants, grown in winter, tolerated much higher Mn and B concentrations, before showing symptoms, than plants grown in the summer.—From authors' abstract.

MAIZE

1294† Specht, G. Der Anbau von Grün- und Silomais in den Bezirken Cottbus, Frankfurt (Oder), Potsdam auf Grund neuer Versuchsergebnisse. [**Cultivation of green- and silo-maize in the districts of Cottbus, Frankfurt (Oder), and Potsdam, based on recent trials.**] *Dtsch. Landw.* 1957, **8,** No. 4, 168–71. [Inst. Landw. Versuchs- u. Untersuchwes., Potsdam, E. Germany]

After some years of neglect in Eastern Germany, maize has been introduced into the cultivation plan during the past 2 years, especially for silage, and replaces fodder-beet. When growing silo-maize the object is to produce a crop with a high proportion of cobs as well as a high total yield. It is grown after an early-harvested winter catch crop. In the year 1956, 10 May proved to be the best sowing date ; when sown later than this yields declined and when sown after 10 June no cobs were formed. Sowing pre-germinated seed gave better yields than ordinary seed [1 year's results]. The best plant density was 8–10 per sq. m. This is attained by 1 plant every 15 cm. or 2 plants per 30 cm. in rows 62·5 cm. apart, or by 3–4 plants per square of (62·5 × 62·5) sq. cm. To remove weeds the crop is best harrowed before and shortly after the crop emerges. Supplementary manuring at the rate of 20–40 kg. N/ha. shortly before earing increased the proportion of cobs in the total yield. The cobs must attain the thick-milk stage before autumn frosts. The crop can be harvested with a mower-chopper at the rate of 1 ton per 3–4 min.—D.B.

1295 Gueit and Laby. Rendement et peuplement de la culture du maïs hybride en Algérie. [**Yield and plant density of hybrid maize in Algeria.**] *Bull. Renseign. agric. 26,* 1956, pp. 5.

Results from 4 years' trials indicated that : (a) it is preferable to have only one plant per pocket after thinning ; (b) with irrigation the optimal density is 40,000–50,000 plants per ha. ; (c) without irrigation, 20,000–25,000 plants per ha. give the highest yields.—E.B.O.

1296 Hemingway, J. S. **Effects of population density on yield of maize.** *E. Afr. agric. J.* 1957, **22,** No. 4, 199–202, bibl. 2, illus. [Tanganyika Agric. Corp.]

In a study carried out at Nachingwea in 1956, the maximum yield (2600–2700 lb. of seed/ac.) was obtained with plant populations of 15,000–30,000 per ac. This large population range suggests the adaptability over a wide range of growth conditions of the variety used, Katumbili Nachingwea. An increasing percentage of unproductive plants, lower ear numbers, lower seed-row numbers on the ear, shorter ear lengths, lighter and fewer seeds per plant and lower shelling percentages were closely associated with increasing populations.—From author's summary.

1297 Zuber, M. S. and Grogan, C. O. **Rates of planting studies with corn.** *Res. Bull. 610 Missouri Agric. Exp. Sta.* 1956, pp. 16, illus.

Prolific maize hybrids, grown in one highly favourable season, gave somewhat higher yields and a narrower yield range for different sowing rates than the single-ear types. The best plant stand was 12,000/ac. Lodging more than doubled with each increase of 4000 plants above 8000/ac. With increases in plant stand, ear height increased slightly and grain moisture-content, average ear-weight and number per plant decreased.—J.F.C.

1298 Laumonnier, R. En Anjou, la production du maïs-hybride de semence. [**The production of hybrid maize seed in Anjou (France).**] *Potasse* 1957, **31,** No. 243, 47–50, illus.

Information is given on the growing in Anjou of hybrid maize for seed. In 1956, about 300 ha. of hybrid maize yielded 1,200,000 kg. of seed. The varieties grown range from W 240, very early, to Ia 4417, late.—E.B.O.

1299 Buchele, W. F. **Ridge farming and plant root environment.** [Abstract] *Iowa State Coll. J. Sci.* 1956, **30,** No. 3, 322–3. [Dep. Agric., Engng, Agron., Iowa State Coll.]

After the primary tillage, ridges were warmer than furrows, but later, no difference was noted. Ridging favoured the weight and height of maize

stalks, the development of the root system and provided some measure of weed control. The rate of nitrification was greater in the ridge than in flat-farmed land. Crop yields from the 2 systems differed little.—From abstract.

1300 Ludwig, J. W. and others. **The influence of environment on seed and seedling mortality. 3. The influence of aspect on maize germination.** *J. Ecol.* 1957, **45**, No. 1, 205–24, bibl. 20, illus. [Dep. Agric., Univ. Oxford]

Maize of five different varieties was sown at weekly intervals from 30 March until 11 May, on pyramids of soil of slope 22·5°, 11·25° and 6·25° with faces to north, south, east and west. Comparison was made with sowings on horizontal ground with respect to ultimate emergence and the time taken for 50% emergence. Continuous temperature records were taken at 2 in. (5 cm.) depth on each aspect of every slope. The advantage of south slopes (and to a lesser extent west slopes) for early emergence and good establishment is shown and contrasted with the disadvantage of north and east slopes. The importance of angle of slope changes with the season. Consideration is given to the use of accumulated temperature measurements, both for the comparison of habitats and the assessment of varietal performance. A close relationship is found between soil temperature and the time elapsed from sowing to 50% emergence of maize ; the latter is largely correlated, inversely, with the ultimate emergence of maize. Of the varieties studied, Baanbreker (a Dutch open-pollinated flint maize), gave the highest emergence from all sowing dates, followed by Goudster (a Dutch flint × dent varietal hybrid). The American hybrid, Wisconsin 240, also gave good emergence from early sowing, with slight superiority of the seed from the flint parent. White Horsetooth was very slow to emerge and gave poor emergence.—Authors' summary.

1301 Instituut voor Rassenonderzoek van Landbouwgewassen, Netherlands. Bericht over rassenkeuze No. 227. Korrelmaïs, 1957. [**Choice of varieties. Pamphlet No. 227. Grain maize, 1957.**] *Suppl. 10, Landb Voorl.* 1957, **14**, No. 3, 1–2.

Maize grown for grain occupied 4300 ha. in 1956, practically all in the south-eastern sandy-lands. In addition to short descriptions, the grain yield obtained in different soil types is recorded for 4 early, 4 medium-early and 4 medium-late to late varieties, some of them standard material registered in the official List, others new varieties under trial. The most widely grown early variety was Early Yellow Round C.B. The medium-early Goudster, however, became still more widely grown in 1956, occupying 82% of the area. The highest average yields were obtained from the medium-early varieties.—G.M.R.

1302 Vengris, J. **Quackgrass control in field corn.** *Proc. 11th N.E. Weed Contr. Conf.* 1957, 181–6, bibl. 1. [Massachusetts Agric. Exp. Sta., Amherst]

Pre-sowing applications of dalapon at *c.* 10 lb./ac. in autumn or spring were promising for the control of *Agropyron repens* in maize.—M.P.

1303 Staniforth, D. W. and others. **Weed control in corn.** *Iowa Fm Sci.* 1957, **11**, No. 10, 3–6, illus. [Iowa State Coll.]

Experiments, in which broadleaved weeds were controlled by 2,4-D, showed that moderate infestations of foxtail [*Setaria* sp.] reduced maize yields by *c.* 9% on average for 1950–5. The average yield of maize infested with weeds, weighing on average 700 lb./ac., was 84 bu./ac., and of weed-free maize 92 bu./ac.—J.F.C.

1304 Staniforth, D. W. (Summarizer). **Corn [weed control in].** [18 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 94–103. [USA] [Received April, 1957]

Amongst the results obtained, CDAA was shown to be slightly superior to CDEA and both were greatly superior to CDEC when applied to maize as pre-emergence sprays at rates of 4 lb. or more/ac. Crop injury was slight and control of grass weeds excellent with 4–8 lb. CDAA or CDEA/ac. Early post-emergence treatment with CDAA, CDEA, dinoseb and urea formulations was promising, but applications after the 3- to 4-leaf stage of maize gave poorer weed control and caused injury to the crop.—From summary.

1305 Gleason, L. S. **Weed control in corn in the wet tropics.** [Abstract] *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 54. [Rockefeller Found., Mexico City]

Since competition from weeds during the 4 weeks immediately following sowing was found to be most injurious to maize yields, it is recommended that, in the wet tropics, 2,4-D or dinoseb [rates not given] should be applied in bands 3 days after sowing. Cultivation or rotary cutting should be carried out 2 weeks later when the maize is about 1 ft. high ; finally, during the 4th week, when the crop is 3 ft. tall, a further cultivation should be carried out on dry soil, otherwise a rotary cutter should be used, followed by an application of 20 gal. diesel oil/ac. or 15 gal. diesel oil + 1 qt. PCP /ac.—From abstract.

1306 Gleason, L. S. and Laird, R. J. **The effect of weed competition on corn yields at different fertility levels.** *Proc.*

13th N. Cent. Weed Contr. Conf. 1956, 8–9. [Rockefeller Found., Mexico City]

A comparison of maize yields with and without weed control at different levels of N-application, showed that the percentage reduction in yield from weedy plots compared with the weed-free control plots was greater with low N-applications than with high ones.—M.P.

1307 APPLE, J. W. **Reduced dosages of insecticides for corn rootworm control.** *J. econ. Ent.* 1957, **50,** No. 1, 28–30, bibl. 5. [Wisconsin Agric. Exp. Sta.]

In tests to evaluate reduced dosages of aldrin and heptachlor for control of *Diabrotica longicornis*, the 2 insecticides were equally effective, at the recommended 1 lb./ac. rate, in reducing lodging of maize and in increasing yields, but heptachlor was still effective and gave better results than aldrin at 0·5 lb./ac.–J.F.C.

1308 BELL, M. E. **Histology of the maize plant in relation to susceptibility to the European corn borer.** *Iowa State Coll. J. Sci.* 1956, **31,** No. 1, 9–17, bibl. 4, illus. [Iowa Agric. Exp. Sta., Ames]

A study was made of the structural development of the maize seedling in relation to invasion and feeding by the European corn borer [*Pyrausta nubilalis*]. When the stem tips of the seedlings were in the vegetative phase the plants were not capable of supporting larvae. Larvae began to survive 8–9 days after plant emergence when the plants were on the threshold of transition from the vegetative to the flowering phase. Larvae fed almost entirely from the upper surface of leaves and the bulliform cells were the loci of attack. Resistant lines had pin-hole lesions involving relatively few cells ; susceptible lines had larger lesions, in proportion to the degree of susceptibility and the size of the larvae.—From author's summary.

1309 BOSS, M. L. **Growth and mineral nutrition of the maize root tip.** [Abstract] *Iowa State Coll. J. Sci.* 1956, **30,** No. 3, 327–8. [Dep. Bot., Pl. Path., Iowa State Coll.]

1310 BECKING, J. H. **On the mechanism of ammonium ion uptake by maize roots.** *Acta bot. néerl.* 1956, **5,** No. 1, 1–79, bibl. 189, illus. [Bot. Lab., Univ. Leiden]

A report is given of a detailed study on the ammonium-ion uptake and hydrogen-ion release in relation to ammonium-ion concentration and pH as observed in intact maize plants. The effect of salts, especially ammonium salts, on the respiration of excised maize roots was also investigated.—M.P.

1311 MAKSIMENKO, L. D. **[Development of the maize plant and grain yield as affected by presowing hardening for drought resistance.]** [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1957, **112,** No. 2, 350–1, bibl. 3.

A sharp increase in the area sown to maize in the Stavropol region (where summer drought is frequent) has emphasized the importance of cultural measures which will reduce damage from drought. The author's experiments were made with the maize hybrid Kollektivnyĭ. Grain was put in a vessel containing water which was placed for 2 days under air temperature fluctuating between 19 and 25°C. The grain was then spread in a thin layer on a wooden floor where air temperature varied between 25 and 30°C. When the grain was partially dried it was placed on a tarpaulin and left to dry in the open air for 7 days, being subsequently sown on 10 or 11 May (square-pocket method) on plots of 3920/m.^{2} (four-fold replication). There is evidence that : (1) the leaves of the plants from treated seed are somewhat wider than those of the controls ; (2) grain yield of plants from treated seed is increased by 7·8% compared with the control. This increase is due mainly to the greater number of cobs per plant, to the greater weight of the cob and, in less degree, to the greater absolute grain weight.—M.H.

1312 DIOS, R. and DIOS, G. Contenido en macro y micronutrientes del grano de algunos híbridos de maíz cultivados en Galicia. **[Contents of macro- and micronutrients in the grain of some maize hybrids grown in Galicia (Spain).]** *An. Edafol. Fisiol. veg.* 1956, **15,** No. 3, 231–52, bibl. 12, English summary. [Misión Biol. de Galicia, Pontevedra]

1313† AUGUSTIN, R. and NIXON, D. A. **Grass pollen constituents: the mesoinositol content.** *Nature, Lond.* 1957, **179,** No. 4558, 530–1, bibl. 8. [Wright-Fleming Inst. Microbiol., St. Mary's Hosp. Med. Sch., London]

The concentration of inositol in grass pollens as determined by means of paper chromatography (e.g. *Dactylis glomerata* 38·8 mg./g., *Lolium multiflorum* 43·1 mg./g., *Zea mays* 38·9 mg./g.) exceeds that found in other plant tissues, the highest value recorded in the literature (16 mg./g. dry tissue) being found in orange (Univ. Texas Publ. 4237, 1942). The significance of the high concentrations is not yet assessed.—M.H.

1314 DIJKHUIS, F. J. **Computation of heat unit accumulations in maize for practical application.** *Euphytica* 1956, **5,** No. 3, 267–75, bibl. 8, illus.

1315 Corby, H. D. L. **Experiments in growing maize on sandveld soils.** *Rhod. agric. J.* 1957, **54**, No. 2, 129–72, bibl. 13, illus. [Grassids Res. Sta., Marandellas, S. Rhodesia]

The results are presented of experiments carried out during 1953–6 concerned mainly with fertilizers and practices thought likely to affect response to fertilizers. N was the main fertilizer requirement of maize grown on sandveld soils ; the response was variable, but large yield-increases usually followed the use of up to 100 lb. N per ac. It was found that the bulk of the dressing should be applied about 5 weeks after sowing, with smaller portions at sowing and at tasseling. Comparisons of forms of N-fertilizer were inconclusive. P_2O_5 at 40–60 lb./ac. appeared to be satisfactory in most cases, and was best applied in bands beside the maize rows or broadcast and ploughed in before sowing. High crop yields were obtained when maize was the first crop after a well-fertilized grass ley, even when no application of P and N was made to the maize. Optimum plant density lay between 12,000 and 14,000 plants/ac. Yields were slightly higher from plants in 3 ft.- than in 6 ft.-rows, but no yield difference was found between row- and hill-planting. Hybrids from the Salisbury Experiment Station outyielded open-pollinated varieties in comparative trials, because fewer of the hybrid plants were barren ; they also responded more to N fertilization and had a higher optimum planting density.—From author's summary.

1316 Tilo, S. N. **The effects of two-year treatments of differential fertilizer on the yield of corn and on the nutrient levels of Lipa clay loam.** *Philipp. Agriculturist* 1957, **40**, No. 8, 413–20, bibl. 4. [Cent. Exp. Sta.]

Yields of maize sown in late May (wet season) and in late November (dry season) of 1954 and '55 averaged 21·9 cavans/ha. [1 cavan = 44 kg.] without fertilizer, 52·5 when 45 kg. N/ha. were applied and 54·7 cavans/ha. when 90 lb. P_2O_5/ha. were also applied. Owing to the importance of moisture in the dry season, it was found better to apply the top-dressing at sowing and 2 weeks later, instead of at 4 weeks after sowing as practised in the wet season.—J.F.C.

1317 Klingman, G. C. **Corn : comparison of three nitrogen sources for weed control and side-dressing.** *Proc. 10th S. Weed Conf.* 1957, 54–8, bibl. 6. [N. Carolina State Coll., Raleigh]

Spray applications of urea or ammonium nitrate (at a rate of 40 lb. N/ac.) when the maize plants were 18 in. high resulted in yields equal to those from solid ammonium nitrate (at 80 lb. N/ac.) applied as a side-dressing and gave good control of weeds.—M.P.

1318 West African Maize Rust Research Unit. **Second Annual Report, 1954.** Ibadan, [n.d.], pp. 50, bibl. 64, illus., 2 maps, 5s. [Received May, 1957]

Included in this report is a preliminary list of fungal and other diseases affecting maize in Nigeria, a progress report on a maize survey of West Africa, and greenhouse studies on resistance of maize to rust (*Puccinia polysora*). Qualitative seedling reactions of new acquisitions and derived lines, and maize types found in West Africa are tabulated in the appendices.—M.P.

1319 Fleming, A. A. and others. **Field plot technique with hybrid corn under Alabama conditions.** *Agron. J.* 1957, **49**, No. 1, 1–4, bibl. 14, illus. [Dep. Agron. Soils, Alabama Polytech. Inst., Auburn]

Based on uniformity-trial data, a plot 2 rows wide and 10–15 hills long (1 plant per hill), i.e. 7 ft. × 17·5–26·3 ft., was considered the optimum size for general use.—J.F.C.

SWEET-CORN

1320 Lana, E. P. **Effects of plant populations and seasons on the performance of sweet corn for canning.** *Proc. Amer. Soc. hort. Sci.* 1956, **67**, 460–7, bibl. 10, illus. [Iowa Agric. Exp. Sta., Ames]

Goldencross, Iochief and Iogreen 56 were used in sowing-rate studies during 1951–3 ; 2, 3, 4, 5 and 6 plants per hill were used, total populations per ac. being 7841, 11762, 15683, 19603 and 23524, respectively. Sowing at 4 plants per hill was considered optimal.—J.F.C.

1321 Hemphill, D. D. **Pre-emergence weed control in sweet corn.** [Abstract] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 149. [Dep. Hort., Missouri Agric. Exp. Sta., Columbia] [Received April, 1957]

Pre-emergence treatments with CDAA, CDEA and CDEC each at 8 lb./ac. gave satisfactory control of weeds in sweet-corn without reducing yields. —From abstract.

1322 Trevett, M. F. and Burnham, R. **Dinitro, trichlorobenzoic acid, simazin and other herbicides for pre-emergence weed control in sweet corn.** *Proc. 11th N.E. Weed Contr. Conf.* 1957, 300–6, bibl. 2, illus. [Univ. Maine, Orono]

Dinoseb at 4·5 lb./ac. applied to sweet-corn at emergence, and simazin at 4 lb./ac. applied at sowing, were superior, at the rates used, to all other herbicides used in these trials.—From summary.

1323 Burgis, D. S. **Pre- and post-emergence weed control in sweet corn.** *Proc. 10th S. Weed Conf.* 1957, 50–3. [Gulf Coast Exp. Sta., Bradenton, Florida]

Karmex (1–1·5 lb./ac.), amino triazole (3 lb.) and cyanamid (granular, 500 lb./ac.) gave excellent control of small broadleaved weeds and grasses in a crop of Joana sweet-corn. Geigy 444 (8 gal./ac.) was particularly effective against *Portulaca oleracea.* —M.P.

1324 Eden, W. G. **Experiments on earworm control on sweet corn.** *J. econ. Ent.* 1956, **49,** No. 6, 822–5, bibl. 15. [Alabama Polytech. Inst., Agric. Exp. Sta., Auburn]

Where DDT sprays were applied at 3-day intervals, control of the corn earworm (*Heliothis zea*) increased as the rate per ac. was increased from 1 to 2·5 lb. One-day intervals between sprays resulted in better earworm control, than 2- and 3-day intervals. Spraying, begun the first day after the first silks appeared, gave better control than spraying begun the second day.—From author's summary.

MILLETS AND SORGHUM

1325 Joshi, N. A. and Tahiliani, B. D. **Cultivation of banti and kuri.** *Farmer, Bombay* 1957, **8,** No. 3, 37–40, illus.

Banti (*Panicum flavidum*) and kuri (*P. helopes*) are Italian millets grown to the extent of 22,840 and 29,742 ac., respectively, in the Banaskantha district of Gujarat.—D.B.

1326 Pawar, R. Y. **Bajri by Japanese method.** *Farmer, Bombay* 1957, **8,** No. 2, 17–18, illus.

The Japanese method of cultivating rice has been applied to *Pennisetum typhoideum* on a private farm. The yield was 3,083 lb. grain and 1,000 lb. fodder against the local average of 900–1,000 lb. [grain] per ac.—D.B.

1327 Ratnaswami, M. C. and Dhanaraj, Leela. **Evolution of a short duration strain in tenai or Italian millet (*Setaria italica* Beauv.) by hybridisation.** *Madras agric. J.* 1957, **44,** No. 2, 59–62, bibl. 2. [Agric. Coll. and Res. Inst., Coimbatore]

A high-yielding, short-duration strain of *S. italica* has been selected for low-rainfall areas. It reaches maturity in 80–85 days, and under rain-fed conditions, gives an average yield of 500 lb./ac. It yielded 19% more than the local varieties.—D.B.

1328 Singh, D. **Smaller millets are in the news.** *Indian Fmg* 1957, **6,** No. 11, 15.

Small millets are grown in almost all districts of Uttar Pradesh. They include *Echinochloa frumentaceum* on 589,000 ac., *Paspalum scrobiculatum* on 1,151,000 ac., *Eleusine coracana* on 407,071 ac. in the hills and 86,000 ac. on the plains. Two types of *E. frumentaceum* have been selected : type 25 for the eastern, and type 46 for the central, districts of Uttar Pradesh. Type 25 matures in about 70 days ; it is somewhat resistant to lodging ; the ears are medium in length, compact, erect, and purple in colour ; it yields 600 lb. grain [per ac.] which is 60% above the yield of local varieties. Type 46 matures in 70 days, is resistant to lodging, has ears resembling those of type 25 and gives an average grain yield, on fertile soil, of 1000 lb. [per ac.]. The best time for sowing *E. frumentaceum* proved to be the 3rd week in June.—D.B.

1329 Anderson, L. E. (Summarizer). **Sorghum [weed control in].** [5 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 91–3. [USA] [Received April, 1957]

It was confirmed that in sorghum severe yield reductions resulted from the application of 2,4-D during the transition stage of growth. No advantages from the addition of mineral-element dusts to 2,4-D were noted. Of the pre-emergence treatments investigated, CDAA at 4 and 8 lb./ac. gave 84 and 87% kill of weeds, respectively, with no apparent injury to the sorghum.—From summary.

1330† Hsi, C. H. **Varietal differences in susceptibility of sorghum to chemical toxicity of a mercury compound (panogen 15).** *Pl. Dis. Reptr* 1957, **41,** No. 4, 312–6. [N. Mexico Agric. Exp. Sta., Plains Substa.]

In tests with 18 sorghum varieties, the recommended rate of 0·75 fluid oz. of the fungicide panogen 15/bu. caused slight or negligible injury, but the 3-oz. rate caused considerable injury to seed and seedlings, emergence varying from 1–85% and seedling injury from 7–100%. Sorgo, milo and hegari types were more tolerant than kafir and related types.—From author's abstract.

1331 Noda, A. and Hayashi, J. **Studies on the coleorhiza of cereals. 3. On the coleorhiza of Japanese barnyard millet, *Panicum crus-galli*.** [Japanese] *Tech. Bull. Kagawa Agric. Coll.* 1956, **7,** No. 3, 231–6, illus., English summary.

1332 Adrian, J. and Sayerse, C. **Composition of Senegal millets and sorghums.** *Brit. J. Nutr.* 1957, **11,** No. 2, 99–105, bibl. 28.

Amongst the species and varieties analysed were *Pennisetum pycnostachyum, P. nigritarum, P. pycno-*

stachyum × *nigritarum*, *Sorghum guineensis*, *S. durra* and *S. caffra*.—M.P.

1333 Rao, B. V. V. and Govindarajan, S. V. **Influence of phosphorus on nitrogen utilization by ragi crop.** *Mysore agric. J.* 1956, **31**, No. 4, 214–19, bibl. 3. [Div. Agric. Chem., Mysore State Dep. Agric.]

In a replicated small-plot experiment, ragi (*Eleusine coracana*) was grown with a constant application of N at 40 lb. per ac. and increasing applications of P_2O_5 ranging from 10 to 160 lb. per ac. The yields, the N- and P_2O_5-content of grain and straw, and the weight of N and P_2O_5 recovered in the crop per sq. yd of soil were determined and tabulated. Crop yields increased with increasing applications of P_2O_5 up to 80 lb. P_2O_5/ac. The recovery of N in the crop steadily increased with increasing levels of P_2O_5.—D.B.

1334 Viets, F. G. and others. **The effect of nitrogen and types of nitrogen carrier on plant uptake of indigenous and applied zinc.** *Proc. Soil Sci. Soc. Amer.* 1957, **21**, No. 2, 197–201, bibl. 8, illus. [Irrig. Exp. Sta., Prosser, Wash.]

Double Dwarf White Sooner Milo (*Sorghum vulgare*) was used in the experiments.—J.F.C.

RICE

1335 Sampietro, G. Ricerche sull'irrigazione del riso. [**Investigations on rice irrigation.**] *Ann. Sta. sper. Risicolt., Vercelli 1954*, 1955, **2**, 9–80, bibl. in text, illus., English and French summaries. [Received Feb., 1957]

Results are given from the first year of trials on rice irrigation in Italy, which are intended to last for 3 years. The objects of these trials, carried out in 12 lysimeters, are : (a) to study the effect on the rice plant of 3 different irrigation methods : continuous submersion ; continuous imbibition (without flooding the soil) ; and periodic waterings supplying 75%, or 50%, of the amount of water supplied by submersion ; (b) to determine the amounts of water consumed in relation to the sub-periods and development stages of rice. The average grain yields obtained were, in kg. per ha. : submersion 8910, imbibition 6013, 75% watering 845, and 50% watering 625.—E.B.O.

1336† Sampietro, G. Criteri per la classificazione delle acque di irrigazione. [**Criteria for classifying irrigation waters.**] *Ann. Sta. sper. Risicolt., Vercelli 1953*, 1955, **1**, 11–65, bibl. in text, English and French summaries. [Received Feb., 1957]

This is an attempt at classifying the waters used in the Po Valley for irrigating mainly rice crops and meadows. The classification given is based on the physical characters of the waters (temperature and silt), their chemical characters (mainly content of fertilizing elements), and discharge. These characteristics are evaluated according to the irrigation method used and the season (summer or winter). The water types considered are : glacial, pluvial, pluvial-glacial, fluvial, lacustrine, mixed, spring, and drainage water from irrigated land.—E.B.O.

1337 Silva, M. V. Aperçu sur la culture et l'amélioration du riz au Portugal. [**An outline of the cultivation and improvement of rice in Portugal.**] *Riz et Rizicult.* 1957, **3**, No. 1, 5–9, illus., English summary. [Esta. Agron. Nac., Oeiras, Portugal]

1338 Jarett, H. R. **Rice production in Sierra Leone.** *Malay J. trop. Geogr.* 1956, **8**, 73–81, bibl. 10, illus.

1339 Dobby, E. G. H. and others. **Padi landscapes of Malaya.** *Malay. J. trop. Geogr.* 1955, **6**, pp. 94, illus.

Field studies of the environment, population, settlement and rice-cultivation methods in the padi-lands of Malaya are reported, and the changing significance of rice-growing in S.E. Asia is discussed.—M.P.

1340 Perur, N. G. **Climate in relation to paddy.** *Poona Agric. Coll. Mag.* 1956, **47**, No. 2, 83–90, bibl. 7.

1341 Thomas, J. E. **Rice in Spain.** *World Crops* 1957, **9**, No. 6, 247–50, illus.

Amongst the varieties most widely grown in Spain, and whose characteristics and method of cultivation are described, are : Bomba, Bombilla, Bombón, E.A.S. No. 1 and No. 2, Originario Benlloch and Sancino, Precocious No. 6.—M.P.

1342 Johnston, T. H. **New rice varieties give high yields.** *Ark. Fm Res.* 1957, **6**, No. 1, 5. [Rice Br. Sta., Stuttgart, USA]

Nato, a new smooth-hulled, medium-grained variety, was outstanding in the 1956 Arkansas rice trials. Over 5 years its average yield has been 87 compared with 85 bu./ac. for Zenith, and yields of head and total milled rice averaged 63 and 72%, respectively, compared with 57 and 71% for Zenith ; its straw is one-tenth shorter than that of Zenith. In 4 years of tests on alkaline soils, medium-grained varieties gave much higher yields than the long-grained Bluebonnet rices. The long-grained variety Toro, on a 4-yr. average, yielded 87 and Bluebonnet 50 yielded 82 bu./ac.—J.F.C.

1343 Serrano, F. B. **New rice hybrids and their commercial possibilities.** *Philipp. J. Sci.* 1956, **85**, No. 2, 263–82, bibl. 16, illus. [Bureau Pl. Industry, Manila]

Four new hybrids, classified under *Oryza sativa* var. *indica*, namely Buenketan, Milketan, Milfor and Milbuen are discussed as regards their important characteristics and commercial possibilities.—From author's summary.

1344 Coleman, P. G. and others. **Observations on the control of weeds in padi fields by the use of herbicides.** *Malay. agric. J.* 1956, **39**, No. 3, 191–9, bibl. 7, illus.

A padi field was treated with various herbicides between 14 and 19 Aug., 1954, i.e. about 7 weeks after broadcasting when the rice plants were about 2 ft. high. The herbicides tested, agroxone 4, MCPA, 2,4,5-T, floroxone and fernoxone were applied at 1, 2 and 3 lb. acid-equivalent per ac. The first 4 of these herbicides were applied as liquid sprays, and the 5th as dust. The effect of all the spray treatments was impressive but there was no noticeable difference between the 3 levels of application. The dust was equally effective but its application was more difficult. The weeds *Monochoria vaginalis* var. *plantaginae*, *Fimbristylis globulosa* and *Jussiaea repens* were very susceptible ; *Fimbristylis miliacea* was susceptible ; *Scirpus grossus* and *Nymphaea stellata* were fairly susceptible ; *Hydrocera triflora* and *Blyxa malayana* resistant ; *Panicum amplexicaule* and *Oryza fatua* very resistant. It is assumed that no damage was caused to the rice by the treatments.—E.B.O.

1345 Rice Journal. **Weed problems in Arkansas rice.** *Rice J.* 1957, **60**, No. 5, 36–7. [Rice Br. Exp. Sta., Stuttgart, Ark.]

In a study of herbicidal injury, 6 varieties of rice were treated with 2,4-D amine at 0·75 and 2 lb./ac. at several growth stages during 1955 and '56. All plots were kept weed-free. Application at the late-tillering stage (usually 7–9 weeks after emergence) caused least injury to the rice, the yield being 79 compared with 80 bu./ac. from the untreated plots.—J.F.C.

1346 Kramer, M. A inibição da germinação do arroz preto e do arroz vermelho pelo 2,4–D. [**The inhibition of germination of black rice and of red rice by 2,4-D.**] *Biológico, S. Paulo* 1957, **23**, No. 3, 51–5, bibl. 5, illus.

Black rice and red rice are distinguishable from white rice by the colour of their pericarp and because their grain sheds easily. In view of these characters they are classed as weeds. In the preliminary investigations described, rice seeds were treated with 2,4-D solutions at different concentrations. Results showed that seeds of white rice are less susceptible to 2,4-D treatment than those of black, or red, rice. At a concentration of 1 g. 2,4,D/1., 80% of the seeds of white rice germinated while one-third only of the seeds of black rice, and about half of those of red rice, germinated. With 800 mg. of 2,4-D per/1. all the white rice seeds germinated while about half of those of black rice and of red rice did not germinate.—E.B.O.

1347 Arai, M. and Kawashima, R. **Ecological studies on weed damage of rice plants in rice cultivation. 1, 2. On the mechanism of competition between rice plants and weeds.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1956, **25**, No. 2, 115–19, bibl. 2, illus., English summary. [Kanto-Tosan Agric. Exp. Sta.]

Competition from weeds is most serious from mid-July onwards. The competition for light and N is strongest at the full tiller stage. The most vigorous competitor is *Panicum crus-galli*.—From English summary.—D.B.

1348 Subba-Rao, N. S. ***In vivo* detection of gibberellic acid in 'foot-rot' infected rice (*Oryza sativa* L.).** *Proc. Indian Acad. Sci.* 1957, **45**, (B), No. 2, 91–4, bibl. 6, illus. [Univ. Bot. Lab., Madras 5]

Chromatographic studies of pure gibberellic acid, of extracts of the roots and shoots of foot-rot-(*Gibberella fujikuroi*) infected rice seedlings, of the susceptible variety MTU 9, and of healthy plants, confirmed the presence of gibberellic acid in the infected plants, and its absence from healthy plants. The eluate from infected plants reproduced, in healthy seedlings, the characteristic symptoms of foot-rot, whereas the eluate from healthy plants did not. It was estimated that the concentration of gibberellic acid in the infected roots and shoots studied was 2·8 and 5·5 mg./100g. fresh weight.—M.P.

1349 Atkins, J. G. and others. **Uniform rice seed treatment tests in Arkansas, Louisiana and Texas, 1955-6.** *Pl. Dis. Reptr* 1957, **41**, No. 2, 105–8, bibl. 15. [Rice Exp. Sta., Arkansas, Louisiana and Texas]

Seed of Zenith and Bluebonnet 50 was treated with 14 fungicides at 0·25, 0·5 or 1 oz./bu. All the fungicides increased emergence. Non-mercurials were equal to mercurials on Zenith, but markedly inferior on Bluebonnet 50. Results confirmed the superiority of the mercurials for the control of *Helminthosporium oryzae*.—J.F.C.

1350 Govindaswamy, C. V. **Seed treatment and seedling vigour.** *Madras agric. J.* 1957, **44**, No. 2, 63–4, bibl. 4. [Agric. Coll., Bapatla, Andhra State]

Seed of a medium-duration variety of rice MTU : 3

was treated with various fungicides, at the rate of 1 g. per lb. of seed, by shaking in the fungicide for 15 min. After 15 days, there was a statistically significant improvement in plant vigour as determined by the height of the central leaf. The preparations of organic mercurial compounds (except tillex) were the most effective both for improving germination and stimulating growth.—D.B.

1351 SENGUPTA, G. C. and ROUT, G. D. **Control of rice stem borer with endrin.** *J. econ. Ent.* 1957, **50**, No. 2, 221, bibl. 2. [State Agric. Res. Sta., Bhubaneswar, Orissa, India]

A 19·5% emulsion of endrin applied to rice twice at 0·38 lb., actual, per ac. gave good protection against the rice-stem borer (*Schoenobius incertulas*). Correct timing of applications proved important. —J.F.C.

1352 ENOMOTO, N. and others. **On the artificial germination of pollen in rice plants. 4. Temperature limits of pollen germination in rice varieties. 5. Effect of low temperature on pollen germination at different stages of primordial panicle development.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1956, **25**, No. 2, 69 and 70, illus., English summaries. [Fac. Agric., Kyoto Univ.]

In Japanese varieties, the maximum temperature limits (40–45°C.) for pollen germination in medium varieties were significantly higher than those in early and late ones. The minimum temperature limits were highest in the early varieties. The minimum temperature limits were significantly lower in foreign varieties than in Japanese ones. Low-temperature treatments caused an appreciable reduction in pollen germination if applied during heading and flowering and a less marked reduction if applied during meiosis. At other growth stages there was no divergence from the control plants.—From authors' summaries.

1353 SAHA, B. **Studies on the development of the embryo of *Oryza sativa* L. and the homologies of its parts.** *Proc. Nat. Inst. Sci. India* 1956, **22 B**, No. 2, 86–101, bibl. 43, illus. [Dacca Univ. India]

1354 AIMI, R. and others. **Physiological studies on the mechanism of ripening in rice plant.** [Japanese] *Proc. Crop. Sci. Soc. Japan* 1956, **25**, No. 2, 124–7, bibl. 11, illus., English summary. [Nat. Inst. Agric. Sci., Japan]

The following changes were observed during development of the rice seed. Starch increased rapidly from the 7th to 20th day and reached a maximum by the 30th day after [fertilization]. Sugars increased up to the 15th day and then decreased rapidly. The seed contained much inorganic P in its early stages of development ; in the endosperm, inorganic P fell after the middle milk-ripe stage and became nil at maturity ; in the aleuron layer and embryo it increased. The amount of phosphorylase in the endosperm increased rapidly to the 18th day and disappeared after the 30th day. The stage of rapid starch formation coincided with the period of greatest phosphorylase activity and of reduction of inorganic P (which inhibits phosphorylase activity). The quantity of rice amylase was very small in early stages but later increased and reached a maximum about the 20th day after [fertilization]. The pH value of the endosperm was at first 5 or less and increased to 6 or more after the milk-ripe stage, this being the pH favourable for synthesis of starch by phosphorylase.—D.B.

1355 MCFARLANE, V. H. and others. **Effects of heat treatment on the viability of rice.** *Tech. Bull. 1129 U.S.D.A. Washington D.C.* 1955, pp. 51, bibl. 91, illus. [Rice Exp. Sta., Crowley, and S. Reg. Res. Lab., New Orleans, La] [Received April, 1957]

Experiments were undertaken during 1950–2 to determine the effects of time and temperature of heating on the viability of paddy rice of different moisture content. For each moisture content, a degree of heat treatment was found, below which there was no decrease in viability. For a given sample of rice, treated for 30 min., the temperature range from initiation to completion of damage to viability was *c.* 8–12°C. The range was about the same for rice of different moisture contents, but was higher on the temperature scale the lower the moisture content of the rice.—From authors' summary.

1356 KASAI, Z. and KINUGAWA, K. **Effects of radiation from P^{32} on development of rice seedlings.** *Soil Pl. Fd* 1956, **2**, No. 2, 89–91, bibl. 6, illus. [Kyoto Univ.]

The effect of ^{32}P, over a range of radioactivities, on the length of roots and leaves of the rice plant was studied. The length of the 3rd leaf was a good indicator of the radioactive effect of the isotope because by then the endosperm nutrients had been exhausted. Activity of 17·5 μc ^{32}P/100 ml. stimulated growth, but doubling the activity inhibited growth.—D.B.

1357 YAMASAKI, M. and HONDA, Y. **Hastening root-formation in rice seedlings by means of supplying straw-ash to the nursery bed.** [Japanese] *Proc. Crop. Sci. Soc. Japan* 1956, **25**, No. 2, 67–8, bibl. 10, English summary. [Fac. Agric., Tokyo Univ. of Education]

Rice-straw ash, applied as a top dressing 15 days before transplanting rice seedlings, promoted root growth in rice plants. The beneficial effect is attributed to an increase in the sucrose content of the seedlings.—From author's summary.

1358 Portères, R. Phyllotaxie et origine ontogénétique de la panicule dans le genre *Oryza*. [**Phyllotaxis and ontogenetic origin of the panicle in the genus *Oryza*.**] *J. Agric. trop et Bot. appl.* 1956, **3**, No. 3–4, 142–62, illus.

1359 Fukaki, S. **The investigation on the tillering of rice plants (*Oryza sativa*). 6. The influence of the plant growth substances on the growth and the tillering of rice plants.** [Japanese] *Tech. Bull. Kagawa Agric. Coll.* 1955, **7**, No. 1, 6–14, bibl. 8, illus., English summary.

Germinated rice seeds were soaked for 24 hr. in growth hormone solutions. There were 8 treatments which included : the K salt of β-indole acetic acid, Na salt of α-naphthalene acetic acid, maleic hydrazide, isopropyl N-phenyl carbamate, 2,4-D Na, and 3 plant hormones. A higher concentration of hormone was required for tillering than for germination. As a result of hormone treatment, the elongation of root and shoot increased by 10–25%, dry weight of above-ground parts by 20–30%, grain yield by 8% and straw yield by 10%. The optimum concentrations of plant hormones were : young seedling, 10^{-4} to 10^{-5} % ; tillering stage, 10^{-3} to 10^{-4}%; ripening stage, 10^{-3} %. It appears necessary to stimulate plant growth both before and after tillering.—From English summary.—D.B.

1360 Manuel, F. C. and Velasco, J. R. **Further observations on the photoperiodic response of Elon-elon rice.** *Philipp. Agriculturist* 1957, **40**, No. 8, 421–32, bibl. 13, illus. [Cent. Exp. Sta.]

Mild temperature (21°C.) during the dark period hastened flowering in rice under a 10-hr. light treatment, and, when continued for 33 days, produced 3 times as much grain as those plants receiving normal night temperatures in July. NAA hastened flowering in plants under an inductive cycle, but failed *per se* to initiate flowering. The youngest fully-formed leaf was evidently the most receptive to photoperiodic stimulus and such stimuli were transferred to ratoons, arising from stubble, but not to a neighbouring tiller of the same age. Continuous illumination elicited a kind of chlorosis resembling the effect of K excess. [See Abs. 531.]—J.F.C.

1361 Kumura, A. **Studies on the production and behaviour of carbohydrates in rice plant. 4. Studies on the physiological characteristics of developmental stages of rice plant by means of photo-periodic treatment.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1956, **25**, No. 2, 122–3, illus., English summary. [Fac. Agric., Tokyo Univ.]

Rice plants growing under different day lengths entered the reproductive phase at different times. Although there were obvious morphological differences between the vegetative and the early reproductive stage there was at this latter stage no change in chemical composition of the plant. As panicles developed, sugars and starch were formed in place of cellulose and hemicellulose. During ripening N intake declined and the main product formed was starch.—From English summary.—D.B.

1362 Sircar, S. M. and Roy, Arati. **Studies on the physiology of rice. 9. Vernalization and devernalization of winter and summer varieties.** *Proc. Nat. Inst. Sci. India* 1956, **22B**, No. 2, 102–111, bibl. 5, illus. [Calcutta Univ.]

Seeds of winter- and summer-varieties of rice were treated, during germination, with low (12°C.) and high (30–37°C.) temperatures continuously and alternately for periods of 1–4 weeks. In winter varieties, continuous high- and low-temperatures retarded, but alternate ones accelerated, flowering. Short-day induction did not intensify the vernalizing reaction. In summer varieties, the optimum vernalizing temperature was 12°C. and the vernalizing effect decreased as the temperature rose to 30–31°C. which is the normal field temperature of the crop. Above this temperature there was a devernalizing effect which increased with duration but could be neutralized by subsequent low-temperature treatment. Vernalization in tropical and temperate crops follows a parallel course in that the vernalizing temperature is well below the normal field temperature.—D.B.

1363 Tamai, T. **Studies on the absorbing properties of upland rice and other crops in different growth periods with automatic recorders.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1956, **25**, No. 2, 61–3, illus., English summary. [Coll. Agric., Ehime Univ.]

The crops studied included upland rice and barley. The amount of water absorbed was proportional to the top growth and the period of maximum water absorption was during flowering. The daily variation in the rate of water absorption is a good index of root activity.—From English summary.—D.B.

1364 Matsubayashi, M. and others. **Studies**

on water economy in crop plants. 2. Water economy in upland rice and soybean with special reference to temperature and soil moisture. [Japanese] *Proc. Crop Sci. Soc. Japan* 1956, **25,** No. 2, 79–80, bibl. 3, illus., English summary. [Tôhoku Nat. Agric. Exp. Sta.]

The accumulation of dry matter is greatest at heading in upland rice but just prior to blooming in soyabean. In upland rice, maximum transpiration occurs between panicle development and the early ripening stage, in soyabean at flowering. From the standpoint of the value of soyabean as green forage and of the utilization of soil moisture, the period of greatest efficiency of transpiration is just before flowering.—From English summary.—D.B.

1365 NAKAMURA, K. **On the translocation of P^{32} between panicle-bearing shoots and barren shoots in rice plant.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1956, **25,** No. 2, 71–2, illus., English summary. [Fac. Agric., Kyushu Univ.]

^{32}P absorbed through the leaf surface was transferred from barren shoots to panicle-bearing shoots, but not in the reverse direction.—From author's summary.

1366 HARADA, T. and EDO, Y. **Studies of lodging resistance in the rice plant. 1. Influence of 2,4-D upon lodging.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1956, **25,** No. 2, 64–6, bibl. 5, illus., English summary. [Hiroshima Agric. Exp. Sta.]

In rice plants sprayed with 2,4-D in the earlier stages of plant growth (33–25 days before earing), the lower internodes grew longer and the upper ones shorter than in the controls. Total culm height was lower and resistance to lodging was greater. Plants sprayed at a later stage (23–5 days before earing) developed longer upper internodes and a greater culm length, they had a lower resistance to lodging than the controls. So far as resistance to lodging is concerned, the best time for spraying rice plants with 2,4–D is before the beginning of internode elongation.—From English summary.—D.B.

1367 NISHIKAWA, K. **On the relation of respiration rate to flood injury in rice seedlings of different nitrogen conditions.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1956, **25,** No. 2, 60, English summary. [Crop Sci. Lab., Kyoto Univ.]

The respiration rate was measured of rice plants grown in pot culture under high and low levels of N. The former had a higher respiration rate than the latter. Plants grown on a high-N level suffered after 3 days' submergence, those on a low-N level were more resistant to submergence. When submerged, plant height increased but dry weight decreased.—From English summary.—D.B.

1368 KATO, Y. and SUZUKI, T. **Micro-climatic studies on the paddy field. Temperature-rising effect of furrowing, mountain soil addition and barn-yard manure supply in the muck paddy field.** *Bull. Inst. agric. Res. Tôhoku Univ.* 1956, **7,** No. 4, 265–78, illus., English summary.

1369 TOMLINSON, T. E. **Changes in a sulphide-containing mangrove soil on drying and their effect upon the suitability of the soil for the growth of rice.** *Emp. J. exp. Agric.* 1957, **25,** No. 98, 108–18, bibl. 17, illus. [W. Afr. Rice Res. Sta., Rokupr, Sierra Leone]

As the soil dried out, the pH fell. Seedlings of the short-duration rice variety Lead made good growth when the pH of the soil lay between 7 and 5 ; at a pH of 5–4, seedlings survived, but tillering was restricted. At pH 4–3 some seedlings were killed, the remainder were stunted. At a lower pH all seedlings were killed. The restriction or failure of growth of rice is attributed to the presence of high levels of availability of Fe and Al at a pH of 5·5 and 4·0.—From author's summary.

1370 RAO, B. V. V. and GOVINDARAJAN, S. V. **Influence of manuring on the yield and composition of paddy and ragi : a study on the recovery of plant nutrients in the crops.** *Mysore agric. J.* 1956, **31,** No. 4, 232–40. [Mysore State Dep. Agric., India]

These experiments are similar to those described in Abs. 1333. On comparing the 2 crops, the recovery of added fertilizer was more complete in *Oryza sativa* than in *Eleusine coracana.*—D.B.

1371 WATANABE, A. **On the effect of the atmospheric nitrogen-fixing blue-green algae on the yield of rice.** [Japanese] *Bot. Mag. Tokyo* 1956, **69,** No. 820–1, bibl. 12, illus., English summary. [Seijo Univ., Setagayaku, Tokyo]

In 11 field experiments, inoculation of rice fields with *Tolypothrix tenuis* from Borneo, resulted in an average increase in yield of rice during the first 4 years of 2·7, 8·4, 19·1, and 21·8%. The effect of this inoculation was equivalent to the application of 64 lb. $(NH_4)_2 SO_4$ per ac.—From English summary.

1372 TANABE, K. **Fundamental studies on the loss of water in rice field.** [Japanese] *Bull. Fac. Agric., Univ. Miyazaki* 1957, **2,** Nos. 1–2, 106–85, bibl. 138, illus., English summary.

1373 Schmidt, J. L. and Hukill, W. V. **Effect of artificial drying on the yield of head rice and the germination of rice.** *Rice J.* 1956, **59**, No. 13, 28–31, illus. [Texas Agric. Exp. Sta., Beaumont]

Four rice varieties were each subjected to 18 drying tests with hot-air temperatures ranging from 90–142°F., and saturation deficits from 0·3–5·6 in. of Hg. The moisture content of the grain was reduced from 17–29% to *c.* 13% in one continuous operation. Germination was reduced when the temperature exceeded 110°F. and was dependent on the initial moisture content. Compared with normal air-dried rice, yield losses of head rice occurred under saturation deficits greater than 2 in. Hg and depended on the variety.—J.F.C.

1374 Vos, L. de. De opslag van padi in Suriname 3. Methoden van opslag. **Storage of rough rice in Surinam. 3. Methods of storage.** *Surinaamse Landbouw* 1956, **4**, No. 6, 208–25, bibl. 9, illus., English summary.

For storing large quantities of paddy in a humid, tropical climate, preference should be given to a horizontal system, and in Surinam the Quonset type of building is the most satisfactory. Underground storage is impossible because of the high ground-water level. Conditioning of the stored paddy is best effected by the suction of air through the material in a downward direction, an air flow of 0·1 m.^{3}/min./ton being sufficient. Daily conditioning for a period of 1–2 hours is generally enough to maintain quality, if applied as a preventive measure as soon as the rice has been stored. —From author's summary.

GENERAL

1375 Friesen, H. A and Walker, D. R. **A comparison of MCP and 2,4,-D for the control of annual weeds in grain crops.** *Canad. J. Pl. Sci.* 1957, **37**, No. 1, 69–81, bibl. 17, illus. [Exp. Farm, Lacombe, Alberta]

Oats, flax and barley were sprayed with various formulations of MCPA and 2,4-D at a number of Experimental Farms in Western Canada in 1954 and 1955. Each formulation was applied at 4 and 8 oz. of acid equivalent per ac. at each of 2 dates : (1) when the weeds were in the seedling stage less than 3 in. in height ; and (2) at a stage coinciding with the first appearance of buds on the major weed species. Stinkweed (*Thlaspi arvense*), wild mustard (*Brassica kaber* var. *pinnatifida*), lamb's quarters (*Chenopodium album*), Russian pigweed (*Axyris amarantoides*), and ball mustard (*Neslia paniculata*), were effectively controlled by each of the MCPA and 2,4-D formulations used. Russian thistle (*Salsola kali*) and red-root pigweed (*Amaranthus retroflexus*) were not satisfactorily controlled by MCPA, whereas hemp nettle (*Galeopsis tetrahit*) was not controlled by 2,4-D. Wild buckwheat (*Polygonum convolvulus*) was not controlled by any of the treatments. Each treatment was more effective when applied during the seedling stage of the weeds. On the basis of weed control and yield of grain, the results of this study favour the use of MCPA rather than 2,4-D with either oats or flax. Oats were significantly more tolerant to MCPA, particularly if treated during the early growth stages when weed competition was most critical. With flax, the difference in tolerance was most pronounced in favour of MCPA at the later date of treatment. The 2,4-D ester and low volatile ester resulted in a preponderance of plant deformities, lowered the yields of both oats and flax and delayed the maturity of flax significantly. Barley yields in this study were not adversely affected by any of the treatments.—From authors' abstract.

1376 Breakey, W. J. [Summarizer]. **Spring sown grain [weed control in].** [13 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 83–9. [Canada] [Received April, 1957]

Studies on the effects of 2,4-D and MCPA formulations on the growth and yield of wheat, barley and oats are reported. Control of wild buckwheat (*Polygonum convolvulus*) in wheat was obtained by the use of low-volatile 2,4-D esters at 3, 5 or 8 oz./ac. Treatment at weekly intervals proved very effective. The addition of 1 oz. amino triazole/ac. appeared to improve effectiveness and severely stunted the weed without significantly affecting wheat yields.—From summary.

1377 Friesen, G. [Summarizer]. **Cereal crops and corn [weed control in].** [7 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 85–9.

The papers are mainly concerned with the control of wild oats in cereal crops and the comparative value of 2,4-D and MCPA formulations for the control of the more resistant weed species.—M.P.

1378† Lobenstein, C. W. and Portz, H. L. **Effectiveness of 2,4-D for control of wild garlic and wild onion in winter grains.** [Abstract] *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 39–41. [S. Illinois Univ., Carbondale]

A spring application of 1·5 lb. a.e. 2,4-D/ac. was necessary for significant reduction of aerial bulblet formation by *Allium vineale* and *A. canadense* infesting a grass sod. In cereal crops, 0·75–3·0 lb. a.e./ac. significantly reduced aerial bulblet formation ; the 1·5 lb./ac. rate was best since it retarded both aerial and underground bulblet formation

without seriously affecting the yield of wheat, barley or rye, if the herbicide was applied when the crops were at the most resistant growth stage. Oats were more susceptible to the herbicide, particularly when rapid floral development was taking place. March to early April was best for the control of bulblet formation in wild garlic.—From abstract.

1379 Forsberg, D. E. **Report on wild buckwheat studies at the Experimental Farm, Scott, Saskatchewan.** [Abstract] *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 33. [Canada]

Wild buckwheat [*Polygonum convolvulus*] was successfully controlled by delaying the sowing of the cereal crop. The weed was allowed to grow a little ; it was then cultivated and killed, and the cereal crop was sown 10 days later. Yields were not reduced below those obtained from normal, early-sown crops. Pre-emergence application of 2,4-D or LV-4 (2,4-D ester) at 2 lb./ac. controlled *P. convolvulus*. CIPC (10 lb.), CDAA (8 lb.) and monuron (2 lb.) were not satisfactory when applied alone, but with the addition of 6 lb. 2,4-D butyl ester/ac. to each, up to 80% control of wild buckwheat was obtained. Of the post-emergence treatments tested, a double application, not more than 10 days apart, of 2,4-D, LV-4 or MCPA ester gave the highest kill of the weed. MCPA ester at 5 oz. a.e./ac. was particularly promising. It was shown to be essential to spray when the weed was at the early true-leaf to 2nd-true-leaf stage, regardless of the stage of the crop.—From abstract.

1380 Zimmermann, H.-G. Die Wirkung von Hormonspritzmitteln auf Sonnenblumendurchwuchs in Getreidebeständen. [**The effect of hormone spraying on sunflower growing through a cereal crop.**] *Dtsch. Landw.* 1957, **8**, No. 5, 237–9, illus. [Inst. Pflanzenzüchtung, Biendorf, Kreis Bernburg, E. Germany]

There have been many instances of seed from a previous sunflower crop overwintering, and appearing as a weed in the following cereal crop. Experiments demonstrated that this was prevented by deep ploughing, by having a dense stand of the cereal crop in the spring, and by spraying in spring, about 10–20 days after sunflower emergence, with the herbicide Leuna M, at the rate of 1·0–1·5 kg. herbicide in 600 l. water per ha.—D.B.

1381 Canvin, D. L. and Friesen, G. **An appraisal of losses in grain fields caused by weed competition.** *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 52–3. [Manitoba Agric. Coll., Winnipeg]

1382 Hinke, F. Der Schwarzrost des Getreides und seine Bekämpfung. [**Black rust of cereals and its control.**] *Prakt. Bl. Pflbau PflSchutz* 1957, **52**, No. 1, 3–28, illus.

A large-scale attack on *Berberis vulgaris*, carried out in Bavaria during 1954–5, is described. The lower parts of selected and previously marked bushes were well sprayed with tormona 100, tributon-D or dikofag-T-Öl, each in a 3% solution with diesel oil. The organization of this mass attack, which was carried out by the agricultural and civic authorities, is described. The campaign resulted in remarkable increases in yields of winter-rye and -wheat in 1956.—D.B.

1383 Simon, U. Untersuchungen zur Systematik und Physiologie des Weihenstephaner Getreidesortiments unter besonderer Berücksichtigung des Weizens und der Sommergerste. [**Study of the systematics and physiology of the Weihenstephan cereal varieties with special reference to wheat and spring barley.**] *Z. Acker- u. Pflbau* 1957, **102**, No. 4, 443–60, bibl. 28. [Inst. Acker- u. Pflbau, Techn. Hochsch., München, W. Germany]

1384 Bell, G. D. H. and Whitehouse, R. N. H. **Winter hardiness and frost resistance in cereals.** *Agric. Rev.* 1957, **3**, No. 2, 10–14. [Pl. Breed. Inst., Cambridge]

1385 Börner, H. Die Abgabe organischer Verbindungen aus den Karyopsen, Wurzeln und Ernterückständen von Roggen (*Secale cereale* L.), Weizen (*Triticum aestivum* L.) und Gerste (*Hordeum vulgare* L.) und ihre Bedeutung bei den gegenseitigen Beeinflussung der höheren Pflanzen. [**The organic-compound content of the caryopsides, roots and stubble of rye, wheat and barley, and its significance in the mutual influence of higher plants.**] *Beitr. Biol. Pfl.* 1956, **33**, No. 1, 33–83, bibl. 108, illus. [Inst. für PflSch., Hohenheim]

[See also *Fld Crop Abstr.* 9 : 801.] By extraction and elution, a large number of compounds was identified in the roots, caryopsides and plant residues of these cereals, and their effect on the growth of *Sinapis alba*, *Matricaria maritima*, *Agrostemma githago* and *Papaver rhoeas* was studied. It was found that *p*-oxybenzoic acid inhibited root-growth, and that rye had a higher concentration than the other cereals of compounds which inhibited the growth of roots of *M. maritima*. Inhibition occurred in Petri dishes at concentrations of 10^{-4} and 10^{-3} g./cm^3. It is stressed that the concentrations obtained by extraction from plant organs are higher than those normally excreted. Active excretion by the roots occurred in both sterile and

non-sterile culture media. It is considered that the importance of these excretory products lies in their effect on the microflora surrounding the roots, rather than in their effect on higher plants.—M.P.

1386† NICOLSON, T. H. **Mycorrhiza in grasses and cereals.** *Rep. Nottingham Univ. Sch. Agric. 1956*, 1957, 33–6, bibl. 3, illus.

Mycorrhiza infection was found in the roots of many Gramineae growing in widely differing habitats and soil types, the incidence of infection varying greatly. The ecological aspects of infection were studied.—M.P.

1387 DUNNE, T. C. **A zinc-copper antagonism affecting cereals.** *Aust. Pl. Nutr. Conf. Vol. I. 1956* Melbourne, 1956, 278–83, bibl. 2. [Dep. Agric., Perth, W.A.]

A number of instances are reported where the use of Zn fertilizer has accentuated or induced Cu deficiency in cereals with consequent reduction in grain yields. This was shown to be associated with a reduction in the percentage and total Cu in the tops of the affected plants.—From author's summary.

1388 VAN DOBBEN, W. H. Gedeelde stikstofbemestingen bij granen. [**Nitrogenous fertilizer instalments for cereal crops.**] *Landbouwk. Tijdschr., Wageningen* 1957, **69**, No. 1, 34–7. [Cent. Inst. Agric. Res., Wageningen]

Indications to date suggest the advisability of applying N to cereal crops in three instalments, as follows : (1) a moderate dressing applied as early as possible ; (2) a supplementary dressing, in amount up to the verge of risking lodging, to be applied as soon as it is possible to judge the growth of the crop ; and (3) an extra dressing when the plants begin to ear and the straw will no longer be affected.—G.M.R.

1389† KREYGER, J. Enkele ervaringen met het drogen van landbouwgewassen in de tas. [**Some experience in the stack-drying of crop plants.**] *LandbMechanisatie* 1957, **8**, No. 3, 98–102. [Droogtech. Lab. I.B.V.L.]

A description is given, with diagrams, of an oil heater and its application to the drying of hay and other agricultural products either in stacks or heaps (for which currents of air heated to ± 4°C. are used) or in larger quantities of barn-stored material to which a heat of 25–40°C. can be applied. Three experiments in the stack-drying of grain, made in 1956, are described. In a 5 m.-high stack of sheaves, insufficient drying at the sides as well as in the topmost metre showed the necessity for distributing the ventilating air throughout the stack. A second stack received 23 days' ventilation. It had a base of 95 sq. m. and comprised oats from 3·5 ha. (moisture content of straw 44%, of grain 20%) with an upper layer of winter wheat from 2·5 ha. (moisture content of straw 28%, of grain 22%). On threshing, the top was found to be moist, the straw of ± 7 cub. m. being mouldy ; at the bottom the material was rather too dry. The average moisture content of the straw was 18–19% and that of the grain 16–17%. The oil consumption was 2400 litres, electricity 1800 kilowatts. The results of 26 days' ventilation, with slightly heated air, of a third stack, which had a base of 60 sq. m., were unsatisfactory because the component material (winter- and summer-wheat, and some canary seed) differed too much in initial moisture content, that of the summer wheat being 56% in the straw and of the other components 30%.—G.M.R.

1390 SHEPHERD, D. R. **Khapra beetle eradication.** *Agric. Chem.* 1957, **12**, No. 5, 32–3, illus.

In experiments designed to eradicate the khapra beetle [*Trogoderma granaria*], which infests stored grain, it was shown that the beetle could be killed in all stages of development by fumigation with methyl bromide at 3–4 lb./1000 cu. ft. A 5-lb. initial dosage was selected to assure complete kill under the most adverse conditions. The gas had to be maintained at 32 oz. per 1000 cu. ft. for 24 hr. during the 48-hr. period of fumigation. As a safeguard against the spread of the pest during treatment, an area of 100 ft. in diameter surrounding the site was sprayed thrice at 3-day intervals with malathion at 5 lb. in 100 gal. diesel oil.—J.F.C.

1391† CHATTERTON, J. **A multi-purpose crop drier.** *Rep. Nottingham Univ. Sch. Agric. 1956*, 1957, 55–61, illus.

The small multi-purpose crop drier developed at the University of Nottingham is described. It is considered to be of value particularly on the smaller farms. It can be used for drying high-quality herbage, combine-harvested grain, sheaves and bales. The initial cost and the running costs of the drier are low.—M.P.

1392 ROTHAMSTED EXPERIMENTAL STATION. **Cereals.** *Rep. Rothamsted Exp. Sta. 1956* Harpenden, 1957, pp. 280.

INVESTIGATIONS REPORTED :

1. Methods of application and rates of N fertilizer for cereals. By F. V. Widdowson and others, pp. 43–5. Winter wheat. At 2 centres 4 cwt., and at 2 others 8 cwt., nitrochalk/ac. as a spring top-dressing sufficed for maximum yields. There were no gains at any centre from a split application of 1 cwt. in the autumn and the rest in the spring. Spring cereals. In comparative trials over a number of years, barley and wheat received

ammonium sulphate combine-drilled or broadcast and were top-dressed with nitrochalk. Barley gave much larger responses to N than did wheat. Combine-drilling was superior to broadcasting. Results suggested that in the area of the trials a N top-dressing in May cannot be recommended for spring barley.

2. Comparison of forms of N fertilizers for spring cereals, p. 45. Calcium nitrate was slightly superior to ammonium sulphate only when broadcast. Combine-drilling of ammonium sulphate gave higher yields of barley than broadcasting, but with $Ca(NO_3)_2$ broadcasting was better. For wheat, broadcasting either fertilizer was better than combine-drilling.

3. Combine-drilling K fertilizers for spring-sown barley, p. 43. In 3 out of 4 experiments, 0·5 cwt. K_2O/ac. was superior to 0·25 cwt. combine-drilled and both were better than 0·5 cwt. K_2O/ac. broadcast and harrowed into the seed-bed.

4. Effect of time of application of N fertilizer to barley, pp. 84–5. A single application [no rate given] of N at sowing greatly increased the grain yield of Proctor and Plumage Archer, but had no effect when given at ear emergence only. A double application at sowing increased the yield of Proctor only, whereas a single dose at sowing and again at ear emergence increased the yields of Plumage Archer only. N affected the number of shoots produced but this did not affect the yield. Shading the ears resulted in a 27% decrease in the grain yield of both varieties on average of all treatments.

5. Radiation effects and recovery of ^{32}P-labelled superphosphate, pp. 47–9. Field- and pot-trials with barley suggest that reducing effects on yield and total P-uptake due to the active isotope may occur, but they are generally small in comparison with the increases in yield and P-uptake given by the main treatment. The P-recovery from ^{32}P-labelled superphosphate averaged 14% during 1952–6, where 0·1 cwt. P_2O_5/ac. was drilled with the seed and 8% where 0·2 cwt. P_2O_5/ac. was broadcast.

6. Nutrient uptake by excised barley roots, pp. 77–9. Excised roots showed variations in nutrient uptake from, or loss to, an aerated nutrient solution that reflected differences in nutrient supply from the soil, including deficiencies, induced by the removal of nutrients by the grown plants. Results so far obtained on the effect of the removal of part of the root system on subsequent growth and nutrient uptake of the barley plant are given.

7. Varietal differences in yield of barley, pp. 83–4. [See *Fld Crop Abstr.* 9 : 1417.] Plumage Archer, Herta and Proctor were compared. The total dry weight, the leaf-area index and the net assimilation rate were similar for all varieties throughout the growing period, but the fraction of dry-matter transferred to the grain differed. Photosynthetic studies showed that results were independent of variety or N-supply. About 25% of the dry matter in the grain was produced by photosynthesis in the ears, including 10% from the awns ; the leaves and stems below the flag leaf supplied 15% and the remaining 60% is considered to have come from the flag leaf and peduncle.

8. Photosynthesis of leaf sheaths of cereals, p. 83. The rate of CO_2 absorption/sq. cm. of sheath was *c.* half that per sq. cm. of lamina. Rate of CO_2 uptake/sq. cm. of lamina, or sheath, of a particular leaf was *c.* 70% that of the next higher leaf on the stem. The respiration rate, measured at night, was 2–3 times greater per unit area of sheath than of lamina, due mainly to the greater dry weight of sheath/unit area, and the higher respiration/g. of dry weight.

9. Control of wheat bulb fly, pp. 141–3. Dieldrin, aldrin, heptachlor, parathion and γ-BHC gave best protection, as seed dressings, against *Leptohylemyia coarctata*. Dieldrin (4%) combine-drilled in November or broadcast in February at 1 cwt./ac., and parathion (0·1%) sprayed in March or April at 100 gal./ac. reduced plant damage by wheat bulb fly. Only the broadcast treatment gave a significant increase in grain yields.—M.P.

LEGUMES

SOYABEANS

1393 Caviness, C. E. and Smith, P. E. **Arkansas soybean variety trials 1951 to 1956.** *Rep. Ser. 65 Arkansas Agric. Exp. Sta.* 1957, pp. 12, illus.

Average seed yields of 12 soyabean varieties grown at 4 stations in Arkansas are tabulated. The varieties, grouped as very early, early, early-midseason and late-midseason, are each discussed. —J.F.C.

1394 Hurtt, W. and others. **Pre-emergence control of weeds in soybeans.** *Proc. 11th N.E. Weed Contr. Conf.* 1957, 102–6, bibl. 5. [Maryland Agric. Exp. Sta., College Park]

CIPC at 8 or 9 lb./ac. gave good control of grass, with little or no injury to either the soyabeans or the broadleaved weeds. CDAA, CDEA and CDEC at 6 lb./ac. gave moderate control of the grasses. Neburon at 4 lb./ac. appeared to be selective for the control of the grasses growing in soyabeans.—M.P.

1395 Indyk, H. W. **Pre-emergence weed control in soybeans.** [Abstract] *Proc. 11th N.E. Weed Contr. Conf.* 1957, 107–10. [Delaware Agric. Exp. Sta.]

Na PCP at 25 lb./ac. gave excellent control of weeds, particularly of broadleaved weeds, with no adverse effects on the stand or yield of soyabeans. CDEC at 8–10 lb. and CDAA at 4–8 lb./ac. gave the best control of grasses.—From abstract.

1396 Slife, F. W. (Summarizer). **Soybeans [weed control in].** [9 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 111–15. [Received April, 1957]

The most promising treatments reported for the control of weeds in soyabeans appear to be dinoseb (6–10 lb./ac.), CIPC (4–8 lb./ac.) and NPA (2–8 lb./ac.). It is concluded, however, that cultural practices are best for soyabeans and that herbicides are to be recommended in problem areas only.—From *Weed Abstr.* 5 : 1784.

1397 Staniforth, D. W. **Plant competition studies with soybeans and *Setaria* spp.** [Abstract] *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 9. [Iowa Agric. Exp. Sta., Ames]

[See also Abs. 563.] Soyabean yield-reductions associated with the competition from yellow foxtail (*Setaria lutescens*) were not proportional to the growth and yield of weeds. The reductions did, however, reflect the pattern of rainfall over the season. When moisture was limiting up to late July, yields of soyabeans were reduced by 4–5% due to weeds, regardless of subsequent moisture conditions. When soil moisture became limiting to crop- and weed-growth after July, crop yield-reductions were 13–15% (3–4 bu./ac.), whenever moisture supply had been high in the first half of the season. When moisture was adequate throughout the season, yield losses due to weeds were low. —From abstract.

1398 Clark, F. E. **Should legume inoculants be used without added water?** *Seed World* 1956, **79,** No. 11, 12–14. [U.S.D.A., Beltsville, Md]

In laboratory trials, 83% of the bacterial inoculant was retained by wet soyabean seeds and 8% by dry seeds. In field trials dry seed only was used and the inoculant was added to the seed in the drill box. When inoculants containing 31 and 38% moisture were added at 1 and 2 g./lb. of seed, respectively, retention was 29 and 20%, respectively. This discrepancy between laboratory and field results is attributed to the small size of the samples used in the laboratory studies. It was concluded that 'dry' inoculation at sowing is suitable where batches of seed exceeding 20 lb. are treated under favourable conditions.—M.P.

1399 Bonnier, C. Inoculation bactérienne des graines de soja dans les conditions de la pratique agricole. [**Bacterial inoculation of soyabean seeds under practical conditions.**] *Bull. Inform. INÉAC* 1957, **6,** No. 2, 87–92, illus.

The efficacy of inoculation with selected *Rhizobium*, specific for *Glycine soya*, was demonstrated in the cultural conditions of the Congo basin. For ecological reasons the normal technique of inoculation was impracticable and the inoculum used (S3.15) was accordingly placed in a solid form alongside the beans at sowing. Differences due to inoculation appeared only after 25 days. Under manured conditions, the inoculated plants yielded 441% more N than the controls and, in two other trials without fertilizers, the inoculated beans yielded 245% and 220% of the N in the controls.—M.H.F.

1400 Clark, F. E. **Nodulation responses of two near isogenic lines of the soybean.** *Canad. J. Microbiol.* 1957, **3,** No. 2, 113–23, bibl. 12. [Soil and Water Conserv. Res. Br., Agric. Res. Serv., Beltsville, Md, USA]

1401 Blanchard, M. Recherches sur la biologie et la culture du soja en Algérie. [**Research on the biology and cultivation of soyabean in Algeria.**] *Ann. Inst. agric. Algér.* 1956, **9,** No. 7, 1–115, bibl. 162, illus.

The Maison-Carrée collection of 153 varieties of soyabean includes the 97 varieties originally collected and studied in Paris. The morphological characters associated with the seed, with the young, adult and mature plants, and with the pods have been combined into a key for determining varietal names and eliminating synonyms. The varieties have been classified into 3 groups on the basis of the ratio of the number of days from sowing to flowering (or to maturity) in Paris to the corresponding number at Maison-Carrée. The comparison of the characters under the two environments focussed attention on photoperiodism and temperature. The "heliothermic index" is calculated from number of days of vegetation × mean daily temperature × mean length of day.—M.H.F.

1402 Graham, E. R. and others. **Soil magnesium and the growth and chemical composition of plants.** *Res. Bull. 607 Missouri Agric. Exp. Sta.* 1956, pp. 20, bibl. 9.

In cultures of soyabeans using sand and colloidal clay, chelated Mg, supplied as soluble Mg-EDTA at low concentrations, was as effective in increasing growth and Mg-uptake as high concentrations of Mg supplied by $MgCO_3$. The Mg-treatments resulted in an increase in Ca-uptake but had little, if any, effect on P- and K-uptake at the levels used.—From authors' summary.

GROUNDNUTS

1403 Guilhaumaud, Y. La culture de l'arachide en Espagne. [**Groundnut growing in Spain.**] *Oléagineux* 1957, **12**, No. 4, 201–5, illus.

1404 Oram, P. A. **High-quality groundnuts for direct consumption. 1. Production, research and development in Libya. 2. Cultivation and marketing.** *World Crops* 1957, **9**, No. 4, 159–62 ; No. 5, 201–4, bibl. 9, illus.

1405 Bologna, L. M. La coltura delle arachidi nella vallata del Niari (A.E.F.). [**Groundnut cultivation in the Niari Valley (French Equatorial Africa).**] *Riv. Agric. subtrop.* 1957, **51**, No. 1–3, 65–75.

Information is given on the agronomy and economics of groundnut cultivation in the Niari Valley.—From author's summary.

1406 Rao, M. B. and Srinivasalu, N. **Economic spacing for irrigated bunch groundnut.** *Madras agric. J.* 1957, **44**, No. 2, 43–7. [Agric. Res. Sta., Tindivanam]

The cultivation of a short-duration (3·5 months) bunch-type groundnut as an irrigated, summer crop in rice fallow is being encouraged to produce oil and to increase soil fertility. It requires 2–3 fewer irrigations than the spreading variety. A 3-year replicated experiment was conducted to find out the most profitable spacing of plants, the spacings tested being, in inches, 6 × 6, 9 × 6, 9 × 9, 12 × 9 and 12 × 12. In all 3 years the differences in yield between the different spacings were significant, but the differences in yield decreased as the spacings increased. The best yields were obtained from the spacings 6×6 and 9 × 6, but in the 3-year average, the highest net-profit was obtained from 9 × 6. This plant spacing requires a seeding rate of 90 lb. [per ac.] of picked kernels.—D.B.

1407 Watson, A. J. and Nation, H. A. **Response of peanuts and annual weeds to early post-emergence applications of the alkanolamine salt of DNBP.** *Proc. 10th S. Weed Conf.* 1957, 95–100, bibl. 4. [Dow Chem. Co., Greenville, Mississippi]

Field experiments indicated that the alkanolamine salt of DNBP at 3–4·5 lb. in 30–50 gal./ac. can be used safely and effectively as an early post-emergence spray on groundnuts. For minimum crop injury the application should be made before the plants reach a diameter of *c.* 3 in. To be effective on annual grasses, these should be sprayed before they reach the 2-leaf stage.—From authors' summary.

1408 Chappell, W. E. **Comparison of granular and spray application of herbicides on peanuts.** *Proc. 10th S. Weed Conf.* 1957, 87–94, bibl. 1, illus. [Virginia Agric. Exp. Sta.]

Vermiculite formulations of herbicides were equal, and in many instances superior, to spray formulations. Weed control and groundnut yields were not affected by incorporating the herbicides into the soil before sowing compared with surface applications after sowing.—From author's summary.

1409 Prevot, P. and Ollagnier, M. Le problème de l'eau dans l'arachide. [**The water problem in groundnuts.**] *Oléagineux* 1957, **12**, No. 4, 215–23, bibl. 6, illus.

This review of research gives results of preliminary studies on the water problems of groundnuts, carried out at various stations of the Inst. Rech. Huiles et Oléagineux. Results of pot trials by A. Orgias indicated that the application of increasing amounts of water increased considerably the intensity and the duration of growth without modifying its rhythm. J. Renouleau found that soaking the seeds, and then dehydrating them, increased the retention of water in the plant tissues during drought ; the ratio dry stem-weight/dry leaf-weight was also increased. These characteristics were maintained until harvest. Trials by P. Fourrier, in which the plots were temporarily covered, indicated that suspension of rainfall at flowering lowered yields considerably ; even with a low rainfall (260 mm. from sowing to harvest) N manuring increased yields considerably.—E.B.O.

1410 Fortanier, E. J. De beïnvloeding van de bloei bij *Arachis hypogaea* L. **Control of flowering in *A. hypogaea*.** *Doct. Thesis, Agric. Univ., Wageningen* 1957, pp. 116, illus., bibl. 161, English summary.

The effect of light (intensity, duration and spectral composition), temperature (varying day- and night-temperature) and water (varying humidities of the soil and the air) on flowering of the groundnut (*A. hypogaea* var. Schwarz 21) was investigated (Part 2). Because growth and fruit formation are also influenced by these factors, the relation between growth, flowering and fruiting was the allied problem investigated (Part 3). Defoliation suppressed flowering ; no antagonism was found between growth and flowering. Removal of pegs and fruits promoted flowering which is suppressed by developing fruits. The initiation of flowers is independent of photoperiodism and of thermoperiodicity and cannot be regulated. The formation of leaves and inflorescences are almost inseparable. The opening of flower buds and the total number of flowers formed are highly depen-

dent on external conditions. Hence flower-bud initiation is less sensitive to external conditions than the actual flowering. The experiments gave a better insight in the physiology of flowering, which can be regulated now, more or less, at will. An abundant or poor flowering can be obtained ; the opening of flowers can be delayed, prevented or continued " indefinitely " ; in this way almost any number of opened flowers can be at one's disposal at any time of the year or the day.—English summary.

1411 Kobayashi, M. **Studies on fructification in the peanut as related to the position on the plant.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1956, **25,** No. 2, 87, illus., English summary. [Fac. Educ., Chiba Univ.]

The total weight [of pod and seeds] and the average weight of seeds in the pod of *Arachis hypogaea* were greatest at the lower internodes and decreased towards the higher ones. In any one flower-cluster, the seed from the first flower was heavier than from the second or third flower, even though all flowered on the same day.—From English summary.—D.B.

1412 Reid, P. H. **Some physiological and chemical changes in peanuts affected by fruit development and the level of nutrient elements.** *Diss. Abstr.* 1956, **16,** No. 11, 1990–1. [N. Carolina State Coll.]

The mineral composition of groundnut plants was studied throughout the growth of those plants in which the fruiting cycle was interrupted after the production of flowers, pegs and pods, and results were compared with plants grown to produce maximum yield of seed. Growth, flower- and peg-production were greater from those plants which had produced no pegs than from those which had produced the maximum amount of seed. The N, P, Mg, Fe and Al levels of the leaves were lower in the plants which produced maximum seed. Ca, K and Mn levels were highest in plants which developed the most pods. When pod and seed development were limited by Ca-deficiency, flower and peg production were higher, but pod production was lower than from the plants which received adequate Ca. When N, P, Ca, Mg or B were withheld at any stage, deficiency symptoms developed rapidly ; for all other elements the symptoms developed slowly or not at all on plants supplied with those elements until early flowering. Very severe B deficiency prevented flower formation ; less severe deficiency resulted in no pegs being formed. Withholding N, K, Ca or Mg after the start of flowering greatly decreased fruit development. An increased supply of ammonium-N increased K and P levels of the leaves but decreased Ca and Mg.—J.F.C.

1413 Teter, N. C. and Givens, R. L. **Farm curing of Virginia type peanuts.** [Abstract] *Biol. Abstr.* 1957, **31,** No. 2, Abs. No. 5647.

The quality of stack-cured groundnuts was equalled when the nuts were cured by using a pick-up type combine on the windrows 3–14 days after harvest or when the seed water-content reached *c.* 20%, followed by the removal of excess water using a current of warm air in bulk-type drying bins.—From abstract.

PEAS

1414 Jasmin, J. J. and Lyall, L. H. **Weed control in canning peas.** *Proc. 11th N.E. Weed Contr. Conf.* 1957, 34–7, bibl. 3. [Canada]

Dinoseb (amine) applied pre-emergence at 6 lb./ac. or post-emergence at 1·5 lb./ac. gave better weed control than MCPA (amine), 2,4-DB and 2,4-D formulations. The Na salt of MCPB at 36 oz. a.e./ac. was promising, particularly on marginal muck lands.—M.P.

1415 Fox, W. B. [Summarizer]. **Peas and other large seeded legumes.** [6 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 95–8.

Trials on the control of weeds in field peas and soyabeans are reported. Complete control of *Sinapis arvensis* was obtained without injury to peas only with MCPA (Na, K and amine) at 2–6 oz./ac., and dinoseb (amine) 0·75–1·5 oz./ac. applied after emergence. In other trials, Geigy 444E (2-chloro-4,6-bis(diethylamino)-s-triazine) at 6 and 9 lb./ac., applied before emergence to peas or after emergence to soyabeans gave the best weed control, without adversely affecting yields.—M.P.

1416 Sexsmith, J. J. [Summarizer]. **Field and canning peas [weed control in].** [7 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 134–5. [Received April, 1957]

The following pre-emergence treatments caused only slight or no injury to peas and gave satisfactory control of broadleaved annual weeds : dinoseb (amine) 6 and 9 lb., Geigy 444 (chloro diethylamino triazine) 8 lb. and CIPC 8 lb./ac. CDAA and CDEA at 6 lb./ac. gave fairly good control of *Avena fatua.* Promising post-emergence sprays were 0·3 lb. MCPA (amine) + 1 lb. dalapon, or 1 lb. dinoseb (amine) + 1 lb. dalapon/ac.—From summary.

1417 Raacke, Ilse D. **Protein synthesis in ripening pea [*Pisum sativum*] seeds. 1. Analysis of whole seeds. 2. Development of embryos and seed coats. 3. Study of the pods.** *Biochem. J.* 1957, **66**, No. 1, 101–16, bibl. 47, illus. [Biochem. Inst., Univ. Uppsala, Sweden]

1418† Saint-Quervel, A-M. Le. Quelques expériences sur la résistance au gel et la surfusion de jeunes plantes étiolées placées à –4°C. [**Some trials on the resistance to freezing and supercooling of young etiolated plants placed at -4°C.**] *Rev. gén. Bot.* 1956, **63**, No. 753, 514–23, bibl. 15, illus.

Pea and lupin seedlings, up to 11 days old, the outer surfaces of whose roots were covered in paraffin or were dry, withstood supercooling without injury and recovered when subsequently placed at higher temperatures. Paraffin gave no additional protection to intact or dry roots. Where the root surfaces were wet or injured, death occurred at this low temperature owing to the formation on the external surfaces of ice crystals which penetrated the root and brought about further crystallization internally. Rapid cooling also killed the plant because supercooling could not occur.—M.P.

BEANS

1419 Instituut voor Rassenonderzoek van Landbouwgewassen, Wageningen. Bericht over rassenkeuze No. 223. Veldbonnen, 1957. [**Choice of varieties. Pamphlet No. 223. Field beans (*Vicia faba*), 1957.**] *Suppl. 6 Landb Voorl.* 1957, **14**, No. 2, 1–2.

The growing of field beans continued to decline in 1956, when the area was 1500 ha. The yields obtained from 9 standard varieties in different soil types in 1956 trials are listed, and short descriptions of the varieties are given.—G.M.R.

1420† Kadry, A. el R. and Tewif, H. **Seed germination in *Orobanche crenata* Forssk.** *Svensk bot. Tidskr.* 1956, **50**, No. 2, 270–86, bibl. 11, illus. [Facul. Agric., Ein Shams Univ., Cairo]

A study of *O. crenata* showed that seed germinated only when near the roots of the host plant *Vicia faba*, and that germination occurred within a week of being stimulated by secretions from the host root. This secretion began about 1 week before the host plant flowered. Penetration by the parasite occurred if the host root was within 3 mm. of the broomrape, and the exact mode of development and formation of the tubercle depended on the distance between the seed of *O. crenata* and the host root. The lateral roots of *V. faba* were more highly infected by the parasite than was the main tap root.—M.P.

1421 Hodgson, G. L. and Blackman, G. E. **An analysis of the influence of plant density on the growth of *Vicia faba*. 2. The significance of competition for light in relation to plant development at different densities.** *J. exp. Bot.* 1957, **8**, No. 23, 195–219, bibl. 13, illus. [Dep. Agric., Univ. Oxford]

[See also *Fld Crop Abstr.* 10 : 159.] A reduction from a high to a low density has little influence on the subsequent development in *Vicia faba* unless thinning is delayed until the flowering phase. The data show that when the light gradient is such as to restrict the internal supplies of substrates, the growth of those organs with the least competitive ability, e.g. the newly-formed pods, is arrested. It is at this phase that the factors controlling abscission come into play and that abscission is dependent upon a balance between the levels of auxins and the production of an abscission factor.—From authors' summary.

1422 Ueki, K. **The varietal difference of the response of flowering and fruiting in the broad bean by changing the night temperature. 1. Difference of the sensibility to the night temperature in some early and late varieties.** [Japanese] *Tech. Bull. Kagawa Agric. Coll.* 1955, **7**, No. 1, 1–5, bibl. 24, illus., English summary.

1423 Whittington, W. J. **The rôle of boron in the nutrition of certain legumes.** *Rep. Nottingham Univ. Sch. Agric. 1956*, 1957, 31–3, bibl. 6.

Culture-solution experiments were carried out during 1953–6 with field beans and other legumes to determine the effect of B (at 0·0–2·5 ppm.) on vegetative growth and seed yield. Results showed that B was essential for the maintenance of the apical growing points and thereby the continued growth of plants. The vegetative yield was not directly dependent upon the B supply except over a narrow range, whereas the maximum seed yield of beans was obtained with a B concentration at 0·5 ppm.—M.P.

1424† Brouwer, R. **Investigations into the occurrence of active and passive components in the ion uptake by *Vicia faba*.** *Acta bot. néerl.* 1956, **5**, No. 4, 287–314, bibl. 30, illus. [Bot. Lab., Groningen]

GENERAL

1425† Khan, N. A. and Baker, B. E. **The amino-acid composition of some Pakistani pulses.** *J. Sci. Fd Agric.* 1957, **8**, No. 5, 301–5, bibl. 18. [Chem. Dep., Facul. Agric., McGill Univ., Quebec]

1426 Kawamura, S. and others. **Studies on legume starches. 1. Microscopic observation on the granules of starches from some Japanese legumes.** [English] *Tech. Bull. Kagawa Agric. Coll.* 1955, **7**, No. 1, 87–92, bibl. 20, illus., Japanese summary.

Photomicrographs are reproduced and descriptions given of the starch grains found in samples of *Vicia faba*, *Pisum sativum* var. *arvense*, *Phaseolus chrysanthos*, *Ph. aureus*, *Ph. vulgaris*, *Vigna sesquipedalis*, *Dolichos lablab*, *Canavalia gladiata* and *Stizolobium deeringianum*.—D.B.

1427 Masefield, G. B. **The nodulation of annual leguminous crops in Malaya.** *Emp. J. exp. Agric.* 1957, **25**, No. 98, 137–50, bibl. 4.

In 1956 a field reconnaissance was carried out in Malaya, on the nodulation of annual leguminous crops. The degree of nodulation of cowpeas (*Vigna unguiculata*), groundnuts, soyabeans, yam beans (*Pachyrhizus erosus*), peas and green gram (*Phaseolus aureus*) on ordinary soil was very low compared with legumes in the temperate zone, and low compared with the same crops in some other tropical countries. Much higher weights and numbers of nodules were attained where these crops were growing on soils with a high water-table. No greater degree of nodulation was attained by crops grown in the highlands than in the lowlands. *Psophocarpus tetragonolobus* nodulated more heavily than any other legume examined ; when grown on a soil with a high water table, 21 g. of nodules per plant were recorded, equivalent to over 6 cwt. of nodules/ac. In a field experiment, nodule weight on cowpeas was tripled by mulching, significantly increased by watering and decreased by extra cultivations ; there were corresponding variations in plant weight. [See also *Fld Crop Abstr.* 6 : 610.]—From author's summary.

1428† Robinson, R. A. **Legume inoculation—a method of testing Rhizobium cultures.** *E. Afr. agric. J.* 1957, **22**, No. 3, 130–2, bibl. 4, illus. [Scott Agric. Labs, Nairobi, Kenya]

Details are given of a method, developed at the above laboratories, which employs a very large Roux culture tube with an internal ventilation tube between the 2 compartments. The method has the advantage that the apparatus is easily and quickly set up ; the test legume is totally enclosed and kept free from contamination ; water-logging is impossible and drying-out does not occur. With small-seeded legumes, very definite results are produced by the time the plants are about 6 in. tall. The method is less suitable for large-seeded legumes, since the seedlings tend to outgrow the tubes before nodulation occurs.—M.P.

ROOTS

SUGAR-BEET

1429 Thomson, D. C. G. **Sugar-beet growing in the U.K.** *World Crops* 1957, **9**, No. 6, 229–32, illus. [Agric. Devel. Dep., Brit. Sugar Corp. Ltd]

1430 Rasmussen, K. and Warley, T. K. **Transplanting of sugar beet.** *Rep. Nottingham Univ. Sch. Agric. 1956* 1957, 52–5.

Following upon a study of the transplanting of farm crops in Bavaria [see Abs. 706], replicated trials with sugar-beet were laid down at 3 centres in 1956. On the Experimental Farm of the University of Nottingham, sugar-beet was sown in prepared soil-blocks and in control open plots in mid-April. Transplanting from the soil-blocks was carried out mainly in the 2nd week of June, and all plots were harvested at the end of November. Contrary to results obtained in Bavaria, yields of washed beet were higher in drilled than in transplanted plots, being at the rate of 20 and 14·9 tons/ac., respectively. The sugar content in the drilled crop was 0·7% higher, but there was no significant difference in purity or in the noxious-N content. The yield of tops was 18·1 and 20·9 tons/ac., respectively. The same general result was recorded at the 2 other centres. It is felt that before definite conclusions can be reached on the comparative value of these methods, certain experimental deficiencies have yet to be overcome, but the potentialities of the soil-block method are evident. —M.P.

1431 Ririe, D. and Hills, F. J. **Effect of in-the-row spacing of single, double, and multiple plant hills on beet sugar production.** *J. Amer. Soc. Sug. Beet Technol.* 1957, **9**, No. 4, 360–6, bibl. 7. [Univ. California, Davis]

Experiments were carried out to assess the effects on sugar-beet production of variation in the percentage of hills containing 2 (double) or more (multiple) beets. Evenly- and singly-spaced beets showed little yield-variation over a range of 4–12 in. No yield reduction took place with 50% of doubles and even-spacing at 6 or 12 in. At the 12-in. spacing there were no root- and sugar-yield

differences among populations containing 100% single plants, 50% doubles and 25% multiples, but at 8-in. spacing the root yield was reduced with 50% doubles and 25% multiples. It is considered that with 10- or 12-in. spacing, large percentages of doubles and multiples can be tolerated.—From authors' summary.

1432 Ririe, D. and others. **A preliminary evaluation of precision hill planting of sugar beets.** *J. Amer. Soc. Sug. Beet Technol.* 1957, **9**, No. 4, 316–20, bibl. 4, illus. [Univ. California, Davis]

Using a special drill, two hill-distribution patterns were employed, namely : (a) 3 seeds 1 in. apart in hills 8 in. apart ; (b) 5 seeds in hills 12 in. apart; part of each pattern was thinned with long-handled hoes and part was not. Yields were compared with plots conventionally sown and carefully hand-thinned. Both sowing patterns, when not thinned, gave reduced root-yields compared with hand-thinned beets, the reduction being less with the 3-seed hills. Hoe-thinning of both hill spacings resulted in yields equal to those from hand-thinned stands.—From authors' summary.

1433 Hills, F. J. and others. **An evaluation of mechanical thinning of sugar beets in California.** *J. Amer. Soc. Sug. Beet Technol.* 1957, **9**, No. 4, 337–44, bibl. 6.

Eleven field trials were conducted to compare complete machine thinning with hand thinning. Complete mechanical thinning reduced root yields by 0·7–6·5 tons/ac. Thinning mechanically-thinned beets with long-handled hoes usually gave greater yields than complete mechanical thinning, but these yields never equalled those from hand-thinned beets.—From author's summary.

1434 Dubetz, S. and others. **The effect of various preceding crops on sugar beets.** *J. Amer. Soc. Sug. Beet Technol.* 1957, **9**, No. 4, 354–9, bibl. 8, illus. [Lethbridge Exp. Fm, Alberta]

Four-year-average yield data are presented for irrigated sugar-beets when grown after summer-fallow and after 7 preceding crops. Field beans [*Vicia faba*], potatoes and canning peas [*Pisum sativum*] were the best, and barley and sugar-beet the worst, preceding crops. Summer-fallow on irrigated land was not economically justified.—From authors' summary.

1435 Wauthy, R. and Roussel, N. Les résultats des essais comparatifs de variétés de betterave sucrière en Belgique de 1952 à 1956. [**Results of comparative variety trials with sugar-beet in Belgium, 1952-6.**] *Publ. tech. Inst. belge Amélior. Better.* 1956, **24**, No. 4, 153–65, English summary.

The results obtained in Belgian variety trials with sugar-beet during the years 1952–6 are summarized. The seeds tested were drawn from commercial lots and the yield of tops, roots and sugar are detailed for the different varieties. Trials in two sites in the same years gave comparable results and the varietal identities were withheld from the operators until the trials had been completed. Five varieties each year and in each site were duplicated by the inclusion of controls and, in 1956, differences in productivity significant at P=0·05 were recorded 3 times only in 40 comparisons (twice for yields of tops and once for the percentage of sugar in the roots).—M.H.F.

1436 Kloen, D. Polyploïde suiker- en voederbieten. [**Polyploid sugar- and fodder-beet.**] *Landbouwk. Tijdschr., Wageningen* 1957, **69**, No. 1, 44–52, bibl. 1. [Pl. Breed. Found., Wageningen]

1437 Bartl, K. and others. [**Investigations on the low germination capacity of the seed of polyploid sugar-beet.**] [German] *Zucker* 1957, **10**, No. 8, 163. [Pl. Breed. Inst., Kleinwanzleben]

The main reason for the relatively low germination capacity of polyploid types of beet is the high proportion of clusters which contain no seeds. A lesser reason is the occurrence of a relatively high proportion of seeds which fail to germinate. The mechanical hardness of the clusters appears to bear no relation to germination capacity. Experiments with heat treatment and acid treatment of the clusters gave negative results. Soaking the seed failed to improve germination.—From abs. in *Agric. Rev.* **3**, No. 2, 1957.

1438 Orlovskiĭ, N. I. [**Monogerm sugar-beet.**] [Russian] *Doklady Vsesojuz. Akad. S-H Nauk* (*Proc. Lenin Acad. Agric. Sci.*) 1957, **22**, No. 3, 7–13, bibl. 18. [All-Union Sci. Res. Inst. Sugar Beet]

An account is given of investigations made into : (1) the relationship in beet between seed and fruit characters and desirable features in the roots ; and (2) work carried out in the Soviet Union to produce plants with monogerm fruits. There is also a discussion of the merits of monogerm "seed" compared with multiple-germ "seed," with special regard to obviating the labour involved in the thinning process. [For translation of article see p. 221.]—M.H.

1439 Andersen, R. N. (Summarizer). **Sugar beets [weed control in].** [5 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 125–8. [USA] [Received April, 1957]

Numerous herbicides were studied for their effect on the control of weeds and on the yield of roots and sugar, in sugar-beet ; the results obtained are outlined.—M.P.

1440 Nelson, R. T. **Weed control in sugar beets.** *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 58–9, bibl. 1. [Gt W. Sugar Co., Longmont, Colo]

Application of DCU (2 lb./ac.) at sowing, and dalapon (1·5 lb./ac.) post-emergence, gave good control of small-seeded grasses, mainly *Setaria viridis*, and did not adversely affect the stand, yield and sugar-content of sugar-beet. Endothal gave the best control of broad-leaved weeds and some control of grasses, but it caused a slight reduction in crop stand and retarded the rate of sugar-beet emergence in some of the trials.—M.P.

1441 Southwick, L. and others. **The use of dalapon for grass control in sugar beets.** *J. Amer. Soc. Sug. Beet Technol.* 1957, **9**, No. 4, 305–12, bibl. 8.

In this review, root- and sugar-yields are tabulated for experiments in California, Colorado and Nebraska during 1954–6. Application to young grass seedlings of dowpon (Na dalapon) at 4–6 lb./ac., in sufficient water for good spray coverage, is considered adequate and safe ; older seedlings and *Avena fatua* may require 7–9 lb./ac. When spraying, the beet foliage must be avoided. —J.F.C.

1442 Schreiber, K. **Wild oat control in sugar beets.** [Abstract] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 121–2. [Manitoba Sugar Co., Winnipeg]

Propham (IPC) at 1·5–2 lb./ac. or CDAA at 0·4 lb./ac. in 5 gal. water/ac. gave excellent control of wild oats in sugar-beet. Crop damage by propham was negligible, but was more noticeable with CDAA.—From abstract.

1443 Gojmerac, W. L. **Effect of formulations and rates of insecticides on sugar beets.** *Bi-mon. Bull. N. Dakota Agric. Exp. Sta.* 1957, **19**, No. 3, 97–100, illus.

Aldrin, dieldrin and heptachlor applied at high rates (e.g. in lb./ac. granulated : 5·4 of 20%, 6·2 of 5% and 6·5 of 25%, respectively,) reduced the germination and emergence of sugar-beet in a field experiment. These insecticides sprayed at 1 lb. (actual)/ac. on the fertilizer, or mechanically distributed in rows with the beet seeds, were effective in controlling sugar-beet root maggots.—J.F.C.

1444 Cayrol, R. Observations sur la pullulation de deux nouvelles espèces de Noctuidae nuisibles aux cultures de betteraves. [**Observations on the rapid multiplication of two new species of Noctuidae harmful to beet crops (in France).**] *C.R. Acad. Agric. Fr.* 1957, **43**, No. 6, 346–9.

Over the past 3 years *Euxoa nigricans* and *E. aquilina* caterpillars have caused serious damage to certain crops. For controlling attacks on beet in the field, 0·2% dieldrin emulsion is sprayed on the 5–6 lines of beet nearest to the neighbouring cereal patches from which the attack is anticipated. If the caterpillars appear when the beet are being thinned, bran poisoned with 0·3% endrin or dieldrin, is spread the same evening on the thinned areas nearest to the cereals. If thinning is finished before the caterpillars appear, the poisoned bran is spread in the infested areas and is renewed along the field edges every 3 days (1·5–2 m. wide). When re-sowing a field, or part of it, poisoned bait is spread on the soil the same day and then repeated along the borders of the field as the plants germinate.—M.H.F.

1445 Gojmerac, W. L. **Sugar beet root maggot control.** *Bi-mon. Bull. N. Dakota Agric. Exp. Sta.* 1957, **19**, No. 5, 154–8, bibl. 1.

To control the maggot *Tetanops myopaeformis*, sugar-beet seed was treated with insecticides in a 5% solution of the sticker methylcellulose at *c.* 110 ml. per lb. Aldrin, heptachlor, dieldrin and hercules AC 528 were applied as 25% wettable powders at 1 lb./100 lb. of seed. Resulting yield increases were as high as 6 tons/ac. Where insecticides were mixed with the fertilizer, improved yields were obtained by using 1 lb./ac. of 50% American cyanamid 3911 on carbon. All treatments reduced germination and emergence. The amount of insecticide needed could be reduced to 5% of the usual rate by using the sticker. —J.F.C.

1446 Wenzl, H. and Krexner, R. Untersuchungen über die Wirkung der Saatgutbeizung bei Rübe. [**The effect of treatment of fodder- and sugar-beet seed.**] *PflSchBer.* 1957, **18**, No. 8/12, 119–70, bibl. 56, illus.

In this paper, the term " Wurzelbrand " (blackleg) in beet is used for the dying-off of seedlings whether as a result of bacterial infection or of a poor environment. Recommendations for its prevention were made as a result of a large number of experiments on the treatment of beet seed. Seed treatment should be regarded as a substitute measure and employed under unfavourable environmental conditions only. It is recommended for early-sown seed when the soil is likely to be encrusted ; it is superfluous when the seed is sown late. Taking the extent of the gaps in the stand before singling as a guide to the effectivness of the treatment, the most successful agents were products which combined organic mercurial compounds with lindane. Lindane alone acted chiefly as a stimulant to the plant.—D.B.

1447 Möllerström, G. **Sugar beets exhibiting symptoms of magnesium deficiency are getting more common.** *Socker* 1956, **12,** No. 14, 170–2, bibl. 3. [Swedish Sugar Corp.]

1448 Stout, H. **Respiratory losses from sugar beets soon after harvest.** *J. Amer. Soc. Sug. Beet Technol.* 1957, **9,** No. 4, 350–3, bibl. 5, illus.

1449 Minister of Agriculture, Canada. **Maleic hydrazide and sugar yields from beet.** *Rep. Minist. Agric. 1955–6,* 1956, 96.

Maleic hydrazide, applied as a foliar spray, reduced the per-acre yields of tops, roots and sugar but increased the percentage of sugar in the beets.—D.B.

1450 Möllerström, G. **Foliage destruction and sugar-beet yield.** *Socker* 1956, **12,** No. 14, 167–9. [Swedish Sugar Corp.]

Damage to leaves of sugar-beet, as caused in the field by pests, hail, etc., was simulated by artificially damaging the foliage on sugar-beet plants on 20 June, 20 July and 20 August. The largest decrease in both root-weight (54%) and sugar-yield (55%) occurred at 100% damage to tops on 20 June. Foliage damage at 100% on 20 July and 20 August caused a fall in sugar content of 1·7 and 2·5%, respectively. The results from these experiments are similar to those obtained from pest-control experiments carried out in sugar-beet fields heavily attacked by aphids in early July involving practically 100% destruction of tops.—J.K.L.

1451 Elmers, G. **The influence of phosphate and nitrate fertilizers on the composition of foliage and beets. Results from analyses of fertilizer experiments performed by the Farmers Field Trial Associations.** *Socker* 1956, **12,** No. 17, 197–203. [Swedish Sugar Corp., Malmö, Sweden]

1452 Kürten, P. W. and Wermke, M. Einfluss steigender Stickstoffdüngung auf den Zuckerrübenertrag in Abhängigkeit von verschiedenen Wachstumsfaktoren. [**The effect of increasing quantities of N fertilizer on sugar-beet yield in relation to various growth factors.**] *Z. Acker- u. Pflbau* 1957, 102, No. 3, 245–82, bibl. 27, illus.

The effect of the most important growth factors on total yield, sugar yield and yield of tops was determined by analysis of variance of 128 trials carried out in the Federal Republic. In these trials, increasing quantities of N (0, 80, 120, 160 kg. N/ha.) were applied. Beet yield was influenced, in this order, by : N fertilization ; weather during the year ; nature of preceding crop and amount of stable manure applied ; PK basal manuring ; soil type ; soil pH ; and the form in which N was applied. Percentage sugar-content was influenced chiefly by the year's weather and less by the N manuring. In 75% of all experiments the application of 160 kg. N/ha. gave significantly higher results than 120 kg. N/ha. The average of all results showed that by giving 160 kg. N/ha. there was a 26% increase in the yield of sugar-beet, 23% of sugar and 49% of tops.—From German summary provided by authors.

1453 Williams, W. A. and Ririe, D. **Production of sugar beets following winter green manure cropping in California : 1. Nitrogen nutrition, yield, disease and pest status of sugar beets.** *Proc. Soil Sci. Soc. Amer.* 1957, **21,** No. 1, 88–92, bibl. 19, illus. [Dep. Agron., Univ. California, Davis]

Purple vetch (*Vicia atropurpurea*) made available *c.* 80 lb. N/ac. to the succeeding sugar-beet crop as indicated by the response in sugar production and petiole-nitrate. Barley depressed sugar production in unfertilized beets by removing available N. The trend in the content of petiole-nitrate, as influenced by the green manures and fertilizers, was closely related to the sugar content at harvest. —From authors' abstract.

1454 Wauthy, R. Résultats définitifs de 8 années d'expériences sur l'étude de l'époque d'application des engrais azotés minéraux pour la betterave sucrière et de son influence sur la végétation. [**Final results of 8 years' experiments on the time of application of mineral nitrogen fertilizers to sugar-beet and its effect on the vegetation.**] *Pub. tech. Inst. belge Amélior. Better.* 1956, **24,** No. 3, 141–51, English summary.

Calcium cyanamide, ploughed-in during the autumn cultivations, gave greater outputs of roots and sugar but lower yields of tops from sugar-beet than sodium nitrate, ammonium nitrate or ammonium sulphate. Like the last 3 fertilizers, it retarded the spring development of the young plants. Because of its slower action, it was less suitable for spring applications when, in dry years, it caused a burning of the plants. Ploughing-in the total quantity of N-fertilizer in the autumn could not be recommended because this practice retarded development and caused inconvenience at harvesting by encouraging long tap-roots.

Application of fertilizers after autumn cultivations was hampered by the clods and could lead to surface encrustations of Na but did not retard development. The spring harrowing of such applications offered no advantages and it was found better to plough in $\frac{3}{4}$ of the N in the autumn and to add the remainder in an active form just before sowing. For the same levels of N, no significant differences were recorded in sugar yields for the 4 fertilizers although sodium nitrate was less suitable for autumn application.—M.H.F.

1455 Robins, J. S. and others. **1954 irrigation and nitrogen fertilization experiments on sugar beets in the Columbia basin.** *Circ. 278 Washington Agric. Exp. Sta.* 1955, pp. 6. [Received Feb., 1957]

Total water-use for the season was 3–4 ac. ft. for controls, *c.* 6 ac. ft. for intermediate treatments and *c.* 10 ac. ft. for the heaviest applications. The amount of water wasted as runoff and in deep percolation varied from 0·5–1·5, 3–4 and 6·5–8 ac. ft., respectively. Reductions of 15–20% in sugar-beet yield were obtained after adding two to four times as much water as the soil would retain at each irrigation, early in the growing season. Yields from 120 lb. N per ac. were reduced by 15 and 25% for the double and quadruple treatments, from 240 lb. N by 5 and 10% and from 360 lb. N, negligibly. At 2 locations, discing-in the N fertilizer gave lower yields than ploughing-under or side-dressing. Under controlled irrigation, maximum yields were approached in the Columbia Basin at 240 lb. N/ac. At Toppenish, maximum yields were obtained with 120 lb. N/ac.—From authors' summary.

1456 Rothamsted Experimental Station. **Sugar-beet.** *Rep. Rothamsted Exp. Sta. 1956* Harpenden, 1957, 88, 107-10.

Results of trials to determine the effect of varying soil-moisture deficit on the growth of sugar-beet, confirmed that variation of the soil moisture within the range pF4 to field capacity had no effect on total dry-matter production of sugar-beet. Mitscherlich pot cultures proved unsatisfactory for such work, owing to the greater stress of the plants in the pots under dry conditions compared with plants in the field. An experimental sugar-beet seed crop grown under a cover crop of barley contained no sugar-beet yellows. Stecklings which were grown on without transplanting did not lodge, as did transplanted seedlings, and were ready for harvest 2 weeks earlier. Of several insecticides on trial for the control of the vector of sugar-beet yellows virus, metasystox [rate not given] continues to be of value. The effect of the insecticides on germination, growth and yield of sugar-beet and virus-incidence are discussed.—M.P.

SWEDE-TURNIPS

1457 Statens Forsøgsvirksomhed i Plantekultur, Denmark. Forsøg med stammer af kaalroer 1953–56. [**Varietal trials with swedes 1953-6.**] *Medd. 573 Stat. Forsøgsvirk. Plantekult.* [Contained in] *Dansk Frøavl.* 1957, **40,** No. 6, 80–1. [State Agric. Exp. Sta.]

Two Swedish, 1 Norwegian and 12 Danish varieties of swede were tested in the official trials in Denmark in clay-soil (5 places) and in sandy-soil (5 places). Nine varieties were classified as Class I varieties. Bangholm (red-headed variety) Pajbjerg Sahna XI gave the highest yield, 101 hkg. dry matter/ha. and Wilhelmsburger (green-headed variety) Øtofte XI & F the lowest yield, 98 hkg./ha. The Swedish and Norwegian varieties gave a lower yield than the Danish varieties. A special series of experiments was conducted at three locations on soil heavily infested with "club root" [*Plasmodiophora brassicae*]. The green-headed Wilhelmsburger-varieties showed a higher degree of resistance to club root than the red-headed Bangholm-varieties. Wilhelmsburger Øtofte XI & F gave the highest yield in this series and was also the most resistant of the varieties tested. Short descriptive notes on the varieties are given and information on yields of root and tops, dry-matter content, etc., is provided in tabular form.—J.K.L.

1458 Statens Forsøgsvirksomhed i Plantekultur, Denmark. Forsøg med udstrøning og udsprøjtning af boraks til kaalroer. [**Experiments with spreading and spraying borax on swedes.**] *Medd. 571 Stat. Forsøgsvirk. Plantekult.* [Contained in] *Dansk Frøavl* 1957, **40,** No. 5, 61. [State Res. Sta., St. Jyndevad, Denmark]

Brown rot in swedes, caused by B-deficiency, has been increasing in Denmark on light soils. In 1954, experiments were started with swedes on light, sandy soils to study the effect of borax treatments. The attack of brown rot was more severe where soil pH was 7·2 than at pH 6·0. Borax applied at the rate of 30 kg./ha., spread and harrowed in before sowing, gave, on average, almost complete control of brown rot and an increase in yield. Percentage of affected swedes was 76% for untreated and 5% only where 30 kg. borax/ha. had been applied before sowing. Spraying a borax solution did not give the same degree of control as spreading.—J.K.L.

POTATOES

1459 Steikhardt, H. Zum Kartoffelbau nach Winterzwischenfrüchten. [**Potato cultivation after winter catch-crops.**] *Dtsch*

Landw. 1957, **8**, No. 5, 226–31, bibl. 14, illus. [Inst. Landw. Versuchs- u. Untersuchwes., Jena, E. Germany]

Good yields of tubers were obtained when potato cultivation followed an early-harvested, winter catch-crop. The conditions for success were planting as early as possible with chitted seed potatoes and the application of P, K and stable manure at the time of sowing the winter catch-crop. Varieties recommended are Mira, Capella, Voran and Nova, the yields of which were only 6–8% lower than when grown as a main crop. Johanna, Aquila and Ackersegen (all medium-early) yielded 20% less when they followed winter catch-crops than when grown as a main crop. Regarding nutritive value, potatoes had the highest protein value when grown after legumes, e.g. *Trifolium incarnatum* and *Vicia villosa* and the highest starch equivalent value when grown after fodder rye.—D.B.

1460 Wisselink, G. J. De invloed van gescheurde kunstweiden op de opbrengsten en de onderwatergewichten van Voran-aardappelen op zandgrond. [**The effect of ploughed temporary leys upon yield and underwater-weight of Voran potatoes grown in sandy soil.**] *Landb-Voorl.* 1957, **14**, No. 3, 136–41. [Inst. TNO, Groningen]

1461 Poignant, P. and others. Résultats de recherches et d'expérimentations sur le défanage chimique de la pomme de terre. [**Results of experimental work on potato-haulm destruction.**] *Phytiat. Phytopharm.* 1956, **5**, 191–202, bibl. 4. [Sta. Exp. Dargoire, Lyon-Vaise, Rhône, France]

More than 400 formulations have been tested over a period of 5 years. In field trials, high-pressure spraying was found to give the best results. 20% PCP in fuel oil was found to be completely satisfactory. 12–40 kg./ha. should be used, depending on the growth to be killed ; volume rate should be 600–1000 l./ha.—From *Weed Abstr.* 6:765.

1462 Monot, G. Observations et réflexions à la suite de la destruction des fanes en 1956. [**Observations on haulm-killing in 1956.**] *Pomme de terre fr.* 1956, **19**, No. 205, 7–10.

It is concluded that the following preparations are suitable for haulm-killing in potatoes : DNC applied at the rate of 25 kg./ha., DNBP at 4 l./ha., and PCP at 20 kg./ha. These preparations are effective within 24–48 hr. and are harmless to the following crop, while sodium chlorate acts within 5–6 days and may be harmful to the following crop. These preparations are easier to apply than sulphuric acid. Stripping off the leaves by hand is, however, the most effective method of haulm-killing.—E.B.O.

1463 Ventura, M. Essai d'un produit à base de pentachlorophénol pour la destruction chimique des fanes de pommes de terre. [**Trial to test a preparation based on pentachlorophenol for the chemical killing of potato haulms.**] *Pomme de terre fr.* 1957, **20**, No. 209, 9–17.

In 2 trials carried out in Landerneau region, Finistère, a preparation containing 3% PCP (pentachlorophenol), mixed with three times the amount of domestic fuel oil, was found suitable for killing potato haulms. In these trials using the varieties Solanum and Ker Pondy, which have a dense foliage and an erect habit, the best results were obtained by applying 1600 l./ha. The PCP preparation used at 3–3·5% concentration gave results comparable to those obtained by using sodium chlorate at 2–4%. PCP acts more rapidly than sodium chlorate, and the residue it leaves in the soil is less toxic to plants than that left by sodium chlorate. In the case of a colza crop grown after potatoes treated with PCP, it is advisable, however, to allow an interval of 20 days between treatment and sowing.—E.B.O.

1464 Frederiksen, T. **Research on the growth of the potato plant.** *Landbouwk. Tijdschr.* 1957, **69**, No. 3, 237–50. [Danish Distilleries Ltd.]

Reference is made to work on the formation and growth of potato tubers by N. Krijthe in *Neth. J. Agric. Sci.* 1955, 3, 291–305, and the author's studies of the same subject are described under the following heads : difference in the time of tuber formation from one year to another ; yield from different-sized tubers as affected by 3 different times of lifting ; number of tubers and of stems per plant ; size of seed tuber and number of stems ; number of stems and yield per plant ; number of sprouts and weight of seed tuber ; number of sprouts and stems from small and large sets ; weight of seed tubers and number of tubers per plant ; number and weight of tubers per plant in virus-free and virus-infected growing places ; seed tubers produced by plants with few and many tubers respectively ; the relation between time of planting and spraying ; *Rhizoctonia* attack and time of lifting ; cultural measures and culinary quality ; planting distance and size of tubers ; difference in tuber size in individual plants.—G.M.R.

1465 Bailey, P. H. **An investigation into the distribution of potatoes in the ridge.** *J. agric. Engng Res.* 1957, **2**, 146–51, bibl. 1, French, German and Spanish summaries. [Nat. Inst. Agric. Engng, Silsoe, Beds.]

The results of an experiment carried out in York-

shire in 1944 are presented in pictorial, graphical and statistical form. It is shown that the general form of the distribution in a cross-section of the ridge is roughly elliptical and that significant intervarietal differences in distribution can occur. —From author's summary.

1466 Instituut voor Rassenonderzoek van Landbouwgewassen, Wageningen. Bericht over rassenkeuze No. 224. Aardappels, 1957. (Observatieproefvelden). [**Choice of varieties. Pamphlet No. 224. Potatoes, 1957. (Observation field trials).**] *Suppl. 7, Landb Voorl.* 1957, **14,** No. 3, 1–4.

In 1956, 145 fields in different soil types were devoted to the observation of 16 new potato varieties grown in comparison with standard varieties from the Official List. A table shows, in relative figures, the performance of the new and old varieties in tuber yield, and content and yield of dry matter in the different soils, and the degree of earliness of each. Short, descriptive notes on the new varieties are added.—G.M.R.

1467 Instituut voor Rassenonderzoek van Landbouwgewassen, Wageningen. Bericht over rassenkeuze No. 225. Aardappels, 1957. (Interprovinciale proefvelden). [**Choice of varieties. Pamphlet No. 225. Potatoes, 1957. (Interprovincial field trials).**] *Suppl. 8, Landb Voorl.* 1957, **14,** No. 3, 1–6.

Forty-eight potato varieties grown and under trial in the Netherlands are briefly described, classified according to their use, whether for culinary purposes, fodder, factory or export, and again according to their degree of earliness. Tables show in relative figures their yield of tubers, dry-matter content, dry-matter yield, and degree of earliness.—G.M.R.

1468 Höppner, E. and Geidel, H. Ergebnisse der Kartoffel-Sortenprüfungen 1956 des Bundessortenamtes. [**Results of the 1956 potato varietal tests of the Federal Variety Service.**] *Kartoffelbau* 1957, **8,** No. 2, 24–31, illus. [Bundessortenamt, Rethmar, W. Germany]

Tabulated data are given on 52 varieties, classified into (a) early, (b) medium-early, and (c) medium-late to late. (b) and (c) were further classified as ware, ware and industrial, and industrial potatoes. The data include tables of yields from stock seed and their progeny, properties of tubers (shape, colour, size), susceptibility to disease, and starch content (of the industrial types). Special value is attached to size of tuber.—D.B.

1469 Miller, J. C. **Rushmore, a new oblong baking type potato.** *Amer. Potato J.* 1957, **34,** No. 3, 68–9.

Rushmore, a cross between Katahdin and Green Mountain, has shown excellent performance from the Dakotas to Maine. It matures 10–14 days earlier than Burbank. In yielding capacity it is medium, but a high percentage of tubers fall into U.S. grade No. 1. Although a russet variety, it is susceptible to scab. Cooking and baking quality are similar to that of Green Mountain.—J.F.C.

1470 Freeman, J. A. (Summarizer). **Horticultural crops and sugar beets.** [29 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 103–22.

Six abstracts dealing with dalapon, dinoseb, DCU, CDAA, CDEC and other chemicals for the control of weeds in potatoes are included in this section.—M.P.

1471 Müller, K. O. **Wound healing of the potato tuber in relation to infection by *Phytophthora infestans* (Mont.) De Bary.** *Aust. J. biol. Sci.* 1957, **10,** No. 2, 189–96, bibl. 6., illus. [Div. Pl. Industr., CSIRO, Canberra]

1472 Schuster, M. L. and others. **Pentachloronitrobenzene an effective control of common scab and other pests of the potato in Nebraska.** [Abstract] *Amer. Potato J.* 1957, **34,** No. 3, 79.

Field tests conducted during 1953–6 indicated that PCNB can control common scab (*Streptomyces scabies*), tuber flea-beetle (*Epitrix tuberis*) and black scurf (*Rhizoctonia solani*).—From abstract.

1473 Shaw, M. W. **Aphids and seed-potato growing in Scotland.** *Agric. Rev., Lond.* 1957, **3,** No. 1, 28–36, bibl. 16, illus. [Entomol. Dep., N. Scot. Coll. Agric., Aberdeen]

1474 Epps, W. M. **Control of potato seed piece decay in South Carolina 1952-1956.** *Pl. Dis. Reptr* 1957, **41,** No. 3, 148–50, bibl. 3. [Clemson Coll. Truck Exp. Sta., Charleston, S.C.]

Potato seed-piece decay, due to the bacteria *Erwinia atroseptica* and *E. carotovora*, causes severe losses in coastal South Carolina under moist conditions. Streptomycin (20% of the nitrate or 15% of the sulphate) applied in 1955 and '56 as liquid dips or as dust to the freshly cut pieces, gave good control.—J.F.C.

1475 Hoyman, W. G. **Potato seed treatments with antibiotics and other materials for prevention of blackleg.** [Abstract] *Amer. Potato J.* 1957, **34,** No. 3, 75.

One-minute dip treatment of cut seed of Sebago potatoes with $HgCl_2$, acidulated $HgCl_2$ or Semesan

Bel was more effective in reducing blackleg [due to *Bacterium phytophthorum*] than dip or dust treatment with other materials.—From abstract.

1476 Brücher, H. Kritische Betrachtungen zur Nomenklatur argentinischer Wildkartoffeln. 3. Die Serie *Cuneoalata*. [**Critical observations on the taxonomy of Argentine wild potatoes. 3. The series *Cuneoalata*.**] *Züchter* 1957, **27**, No. 2, 77–80, bibl. 7, illus., English summary. [Univ. Nac. de Cuyo, Mendoza, Argentine]

[See also *Fld Crop Abstr.* 9 : 1282.] From extensive studies on the *Cuneoalata*, the author concludes that there is no valid reason for the differentiation of 3 forms in the numerous ecotypes of *Solanum infundibuliforme*, nor for their designation as new species. The great frost- and drought-resistance of this group could be advantageously employed by breeders of cultivated potatoes.—From author's summary.

1477 Burton, W. G. **The dormancy and sprouting of potatoes.** *Fd Sci. Abstr.* 1957, **29**, No. 1, 1–8, bibl. 112, illus. [Ditton Lab., DSIR, Larkfield, Maidstone, Kent]

This is a review article.—G.L.S.

1478 Thijn, G. A. Aardappel en daglengte. [**The potato and daylength.**] *Meded. NAK* 1957, **13**, No. 9, 94–6.

Comparison is made of the widely differing climate of various places in the northern hemisphere, and the effect of different, and changing, daylength upon the behaviour in the potato, by origin a short-day plant, is discussed and illustrated by the findings of Kopetz and Steineck in Vienna (see *Fld Crop Abstr.* 7 : 1280 ; 9 : 1284, 1285 ; 10 : 200, 628). The general effects of long and short (12- and 10-hr.) day are summarized as follows. Long day : tall, stemmy plants ; small leaves ; profuse flowering ; late tuber formation ; late ripening ; long stolons ; rough, lumpy, deep-eyed tubers ; little susceptibility to *Phytophthora* infection. Short day : low-growing, bunched plants ; large, supple leaves ; little or no flowering ; early, rapid tuber formation ; early ripening ; short stolons ; smooth, well-formed tubers ; more susceptibility to *Phytophthora*. It is assumed that for every potato variety there is a critical daylength which, if exceeded, is followed by specific reactions.—G.M.R.

1479 Thijn, G. A. Aardappelteelt en daglengte. [**Potato growing and daylength.**] *Meded. NAK* 1957, **13**, No. 11, 111–2.

With further reference to the studies of Kopetz and Steineck (see previous abs.), a large number of potato varieties are broadly classified into 3 groups, according to their stage of development when lifted at the beginning of July. To the first group belong those which had short stolons and had formed tubers of fairly uniform size ; critical daylength estimated as ± 16·5 hr. The second group comprises those in which some tubers had formed on short stolons, others on longer ones : critical daylength estimated as ± 15·5 hr. Varieties assigned to the third group exhibited the greatest inhibition of tuber formation, with a development of many long stolons some of which emerged above the surface. Critical daylength of this third group was estimated as ± 14 hr. The behaviour of the varieties grown in the Netherlands is discussed in relation to these findings.—G.M.R.

1480 Krug, H. Das photoperiodische Verhalten der Kartoffel (*Solanum tuberosum*). Eine Übersicht. [**The photoperiodic behaviour of the potato (*S. tuberosum*). A review.**] *Angew. Bot.* 1957, **31**, 1/2, 29–44, bibl. 45. [Inst. Pflbau und Saatguterzeugung, Forschanst. Landw., Braunschweig-Völkenrode, W. Germany]

This review of literature, taken from several European countries and from the USA, summarizes present knowledge on flowering and fruiting, top and root growth, and stolon and tuber development in the potato under different day lengths. The alternatives of flowering and tuber formation as the criterion for judging photoperiodic reaction in the potato are discussed.—D.B.

1481 Madec, P. and others. Travaux effectués pendant la période 1945–1955 par le Laboratoire de Recherches sur la pomme de terre à Landerneau. [**Work carried out at the Laboratory for Potato Research, Landerneau, during 1945-55.**] *Ann. Inst. nat. Rech. agron., Paris Ser. B. Ann. Amélior Pl.* 1956, **6**, No. 3, 319–82, bibl. in text. [Sta. Cent. Amélior. Pl., Versailles, France]

This is a review of studies on the physiology of the potato (tuber formation including "little potato", sprout evolution, influence of origin on the behaviour of seed potatoes), and on potato improvement including information on varieties.—E.B.O.

1482 Krijthe, N. Knolzetting en knolgroei bij aardapplen. [**Tuber setting and tuber growth in potatoes.**] *Landbouwk. Tijdschr., Wageningen* 1957, **69**, No. 1, 53. [Potato Storage Found.]

In pre-sprouted seed-potatoes of 7 varieties, all the tubers were formed within a period of 2–3 weeks. The tubers which in this period were the largest grew the most rapidly ; the smaller tubers grew more slowly and the smallest grew very little or not at all. Of the very large number of small tubers set, generally not more than one-half grew to marketable size.—G.M.R.

1483 Rich, A. E. and Becker, R. F. **The effect of irradiation and other treatments of potato tubers on plant growth and virus content.** [Abstract] *Amer. Potato J.* 1957, **34,** No. 3, 78–9.

1484 Rappaport, L. **Growth regulating metabolites.** *Calif. Agric.* 1956, **10,** No. 12, 4, 11. [Univ. California, Davis]

Gibberellin A, at 5 and 500 ppm., was inserted into dormant White Rose potatoes at room temperatures. In 4 weeks, treated tubers developed active sprouts ; controls took 9 weeks. Branched sprouts occurred at almost all of the eyes. Higher concentrations caused earlier and larger sprout development. 90% of Russet Burbank potatoes dipped for 1·5 hr. in 25 ppm. gibberellic acid sprouted within 1 month, as compared with 11% of the control.—J.F.C.

1485 Tagawa, T. and others. **Physiological and morphological studies on potato plants. 20. On the variation in the glutathione contents in the potato tubers during the storage period. 21. Especially on the sprout inhibiting substances in resting potato tubers.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1956, **25,** No. 2, 99 and 100–1, illus., English summaries. [Fac. Agric., Hokkaido Univ.]

20. The glutathione content of potato tubers is low but increases, especially in apical buds, towards the end of dormancy. It increases to a less extent (especially in apical buds) in tubers treated with maleic hydrazide. 21. The sprout-inhibiting substance was extracted from potato tubers. It maintained its activity after boiling in N/10 HCl for 1 hr. but lost it after boiling in N/10 KOH for 1 hr. The sprout-inhibiting substance markedly decreased the permeability of potato tuber cells and should therefore reduce the rate of water uptake by potato parenchyma.—From English summary.—D.B.

1486 Danert, S. Über den Sprossaufbau und die Blattentwicklung bei der Kartoffel. [**The construction of the shoot, and leaf development in the potato.**] *Züchter* 1957, **27,** No. 1, 22–33, bibl. 13, illus. [Inst. KulturpflForsch. Gatersleben, E. Germany]

The branching system and the initiation and development of the floral organs is traced and represented diagrammatically for *Solanum tuberosum* and other species of *Solanum*.—D.B.

1487 Naka, J. and Tamaki, K. **Physiological and ecological studies on potato plants. 7. On the physiological rôle of the stalk during the growing period.** [Japanese] *Tech. Bull. Kagawa Agric. Coll.* 1956, **7,** No. 3, 225–30, bibl. 15, illus., English summary.

Using the variety Irish Cobbler, the variations in the quantities of carbohydrates and N compounds in the apical and basal parts of the stalk were examined at the following stages : early growth, flower formation, flowering, and post-maturity. The percentages of both types of compound fluctuated independently in different parts of the stalk, beginning with a concentration of both in the apical region during early growth and ending with a decrease of both, especially carbohydrates, in apex and base of stalk after maturity had been reached.—From English resumé.—D.B.

1488† Kullmann, A. and Freytag, H. E. Die stofflichen Veränderungen der abgestorbenen Wurzeln einiger Kulturpflanzen. I. Mitteilung über das unterschiedliche Verhalten von Luzerne-, Schafschwingel- und Kartoffelwurzeln. [**The chemical changes in the dead roots of some crop plants. 1. The different behaviour of roots of lucerne, sheeps fescue and potato.**] *Z. Acker- u. Pflbau* 1957, **103,** No. 1, 59–70, bibl. 23, illus. [Inst. Acker- u. Pflbau, Müncheberg (Mark)]

1489 Mulder, E. G. **Effect of mineral nutrition of potato plants on respiration of the tubers.** *Acta bot. néerl.* 1955, **4,** No. 3, 429–51, bibl. 28, illus.

1490 Malyšev, A. A. [**The biological characteristics of the potato plant grown in a damp, alpine climate.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1957, **112,** No. 2, 344–6, bibl. 6. [Teberda State Reserve]

Experiments made at the Teberda (1939–41 and 1953–6) and Altaĭ (1942–5) State Reserves have clarified certain problems regarding the biology of the potato plant when it is grown in moist zones of high mountains (northern slopes of the Western Caucasus and North-east Altaĭ). Because of its unexacting requirements for warmth, the potato can be cultivated at heights considered to be the climatic limits of plant growth. The temperature of the soil in the mountains is usually 2–4°C. higher than that of the air and the tubers are therefore under more favourable conditions than the above-ground parts of the plants. There is evidence that with increasing altitude metabolic processes are changed (e.g. the amount of monosugars is increased and that of saccharose declines). Tuber weight (kg./10 m.²) at 520 m. is 8·3 ; at 1950 m. it is 23·9, after which it declines at 2400 m. to 14·3 and at 3000 m. to 0·9 (from data covering 2 years' observations on 6 early-ripening varieties in the

Western Caucasus). From additional 5-year observations on 8 varieties, it is evident that the increase in potato yields in mountain areas (compared with lowland regions) is determined primarily by the greater number of tubers produced and secondarily by an increase in tuber weight and size. In the upper regions of the sub-alpine zone in the Western Caucasus (2400 m.), the absence of *Phytophthora* infestation is attributed to the soil temperature (15°C.), precipitation (1000 mm. p.a.) and the high intensity of insolation. At high altitudes summer frosts may curtail the vegetative period of the potato plant. In the Altaĭ (1750 m.) a curtailment of the vegetative period by 3 weeks lessens yields by half. At the same time, the accumulation of sugars in the crop grown at great heights increases the plant's frost resistance. (In the Caucasus at 1950 m. toleration of −3°C. is attained by the shoots.) There is also an indication that young tubers grown at 1950–2700 m. give greater yields (13–37%) than old tubers grown at 1330 m. In this connexion the production of seed potatoes in sub-alpine zones is important. Developmental processes are accelerated in material adapted to mountain conditions (tubers are formed 5 days earlier [than those from lower altitudes of reproduction] when grown at 1330 m., 10 days earlier at 2000 m. and 12–15 days earlier at 2400–2700 m.). The absolute climatic limit of potato cultivation in the Caucasus, and in Europe generally, is calculated to be 2700 m., but in more humid regions (e.g. Western Caucasia) the limit is 2200 m. In Teberda, potatoes have been grown up to the snow-line (3000–3400 m.).—M.H.

1491 National Vegetable Research Station. **Fertilizer trials on potatoes.** *Rep. Nat. Veg. Res. Sta., Warwick* 1956, 43.

No significant effects of N at 31, 62 or 93 lb./ac. were noted on the earliness of an early-potato crop. There was a tendency for the higher N treatments to delay tuber formation. It was observed that, at the time of harvest, the weight of tubers was increasing at the rate of 3 cwt./ac. daily.—M.P.

1492 Simpson, K. **The effect of phosphate fertilizers on the potato crop in south-east Scotland.** *J. Sci. Fd Agric.* 1957, **8,** No. 5, 297–301, bibl. 6. [Edinb. and E. Scot. Coll. Agric., Edinburgh]

Appreciable increases in potato yield were obtained from P applications on soils of low P-status only. The optimum rate of superphosphate was *c.* 5 cwt./ac. for the low-P soils, and 1·5 cwt./ac. for soils with higher available P. The latter figure is considerably lower than the present rates (5–9 cwt./ac.) of superphosphate application in the area.—M.P.

1493 Cooke, G. W. and others. **The value of mid-season top-dressing of nitrogen fertilizer for main-crop potatoes.** *J. agric. Sci.* 1957, **49,** Pt 1, 81–7, bibl. 4. [Rothamsted Exp. Sta., Harpenden, Herts.]

During 1953–5, 21 field experiments were carried out on main-crop potatoes to compare the dressing of N applied wholly to the seed bed (as ammonium sulphate), with equivalent dressings applied partly to the seed-bed (as ammonium sulphate) and partly as a top-dressing (as nitro-chalk) just before the final ridges were set up. In general, 1 cwt. N/ac. applied to the seed-bed was nearly sufficient for maximum yields. A further seed-bed dressing of 0·5 cwt. N/ac. gave increases in half of the experiments, but the same amount as a top-dressing increased yields at only one-third of the centres. In nearly all the experiments on medium and heavy soils, a split-application was inferior to applying all the N to the seed-bed. On light soils a split-application resulted in small gains in *c.* half of the trials.—From authors' summary.

1494 Monot, G. and Quidet, P. Essais d'engrais sur pommes de terre. [**Manurial trials with potatoes.**] *Potasse* 1957, **31,** No. 242, 29–32, illus. [Sta. Agron., Quimper, France]

Results from 2 trials indicated that the manuring formula N 60 kg., P_2O_5 120 kg. and K_2O 180 kg., per ha., was best.—E.B.O.

1495 Harrington, F. M. **Fertilizing the potato crop.** *Bull. 509 Montana Agric. Exp. Sta.* 1955, pp. 26, illus. [Received Dec., 1956]

The use of FYM or of a green manure crop such as sweet clover [*Melilotus* sp.] had at least as much influence on yield as the use of inorganic fertilizers alone. The practice of soil build-up with manures combined with fertilizers was far superior to either practice alone. Land heavily cropped or depleted of organic matter required a higher proportion of N to P, e.g. in the mixture 10–20–0 applied at 400 lb./ac. Application of 300 lb. 6–30–0 was effective after the use of manure. Generally, as rates of application of fertilizer combinations were increased or a higher proportion of N was used in the fertilizer, a lowering of tuber-grade, delayed maturity and reduction in netting occurred.—J.F.C.

1496 Juge, L. Conservation de plants de pommes de terre avec irradiations artificielles. [**Storage of seed potatoes with artificial irradiation.**] *Pomme de terre fr.* 1956, **19,** No. 202, 22–4.

Seed potatoes were stored in a warehouse which received only diffused natural light. In a trial which started on 19 Dec., a part of the warehouse was lighted with fluorescent tubes of red light, and another part with tubes of white light. Although the sprouts had formed rapidly on the tubers, on

31 Jan. it was found that they had grown 2–3 mm. only after irradiation had been started ; they were then short, thick and of a deep colour. Although both the red and the white light were effective in arresting sprouting, the red light was better.—E.B.O.

1497 Zannetos, Chr. **Preventing sprouting in ware potatoes.** *Countryman, Nicosia* 1957, 11–12. [Pl. Prot. Serv., Dep. Agric., Nicosia, Cyprus]

The preparation " Neo-conserviet ", containing a derivative of isopropyl-carbamate, was used in potato-storage experiments in Cyprus. Loss in weight after 90 days' storage was 4·5% for treated, and 10% for untreated, potatoes. The treatment controlled sprouting and root development, the treated potatoes remained dry and the incidence of fungus was reduced.—J.K.L.

1498 Green, H. C. **Experiments on the storage of damaged potatoes.** *J. agric. Engng Res.* 1957, **2**, No. 2, 141–5, bibl. 2, French, German and Spanish summaries. [Nat. Inst. Agric. Engng, Silsoe, Beds.]

[See also *Fld Crop Abstr.* 9 : 1297.] After a period of storage in sacks, tubs and, in one season, clamps, those tubers injured by a violent blow showed the greatest amount of deterioration. The presence of soil did not cause any harm.—From author's abstract.

1499 Smith, W. L., Jr. **Decay, surface browning, scald, weight loss, and chipping quality of early-crop potatoes as affected by storage temperatures.** [Abstract] *Amer. Potato J.* 1957, **34**, No. 3, 80.

Early-crop potatoes (Irish Cobbler and Sebago) from south-eastern USA were held at 40–85°F. for 60 days or longer. Decay was most rapid and serious at 85°F ; at 75° or 70°F. it was relatively unimportant until after 25–40 days' storage, while at 60°F. or less, little or no decay developed. Storage temperature had little effect on surface browning, but scald was less at 40° and 50°F. than at higher temperatures. Place of growth and length of tuber exposure after digging affected the amounts of decay, surface-browning and scald. Weight loss, except that caused by decay, was greater at higher temperatures. Chipping quality after storage at 70–85°F. was satisfactory for 60 days. Chips were darker when lower storage temperatures and longer storage periods were used.—From abstract.

1500 Heiligman, F., and Wagner, J. R. **Effects of chloro-IPC on sprouting and losses in white potatoes during storage.** [Abstract] *Amer. Potato J.* 1957, **34**, No. 3, 75.

CIPC controlled sprouting and reduced weight losses during storage of white potatoes at 55, 72 and 85°F., compared with untreated controls. It was effective whether used as a dip, as a spray, or incorporated in water-emulsion potato-wax.—From abstract.

1501 Ophuis, B. G. Ontwikkelingen bij de inrichting van aardappelbewaarplaatsen en het gebruik ervan voor andere produkten. [**Developments in the designing of potato stores and their use for other agricultural products.**] *Landbouwk. Tijdschr., Wageningen* 1957, **69**, No. 1, 54–70, bibl. 11, illus. [Inst. Storage Agric. Prod., Wageningen]

An account is given of improvements which have been made in the ventilation of potato stores, in temperature measurement and control, transport and handling within the stores, and finally in the possibility of using such stores for the keeping or drying of other products such as barley, maize, peas, beans, and beet stecklings.—G.M.R.

1502 Terman, G. L. **Effect of size of plot, experimental design and replication on efficiency of potato fertilizer experiments.** *Amer. Potato J.* 1957, **34**, No. 3, 59–68, bibl. 7, illus. [Maine Agric. Exp. Sta., Orono]

1503 Rothamsted Experimental Station. **Potatoes.** *Rep. Rothamsted Exp. Sta. 1956* Harpenden, 1957, 45–6, 106–7, 144–5.

In fertilizer trials, N, at 0·5, 1·0 and 1·5 cwt./ac., was applied to potatoes as ammonium sulphate, calcium nitrate and urea. 1 cwt. N./ac. sufficed for maximum yields, $Ca(NO_3)_2$ was slightly inferior to ammonium sulphate, while urea, at all rates, was inferior to both fertilizers. Urea checked emergence and early growth when broadcast onto furrowed land before planting, but not when broadcast to the flat land before planting. The biuret content (4%) of the urea is considered to have affected crop growth. [See also Abs. 1493.] In trials on the control of virus diseases in potatoes, DDT emulsion at 2 lb./ac. applied 4 or 6 times at high or low volume gave good control of aphids on potatoes. Results of methods of spraying, indicated that using both underleaf spray jets and overhead jets was superior to using overhead jets only. Date-of-planting and lifting trials confirmed results in previous years. [See *Fld Crop Abstr.* 9 : 1417.]—M.P.

SWEET-POTATOES

1504 Peterson, L. E. **Crabgrass control in sweet potatoes.** [Abstract] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 143–4.

[Dep. Hortic., Iowa Agric. Exp. Sta., Ames] [Received April, 1957]

Good control of crabgrass [*Digitaria* spp.] was given by : 2,4-DES (2–8 lb.), 2,4-DEB (2–8 lb.), 2,4,5-TES (2–4 lb.) and NPA (4–8 lb./ac.). 2,4-DES gave the best control but injured the sweet-potatoes [*Ipomoea batatas*].—From abstract.

1505 Naka, J. and Tamaki, K. **Studies on the physiological nature of sweet potato plants. 6. On the variations of chemical components in the developing vines during the nursery stage.** [Japanese] *Tech. Bull. Kagawa Agric. Coll.* 1956, **7**, No. 2, 180–5, bibl. 18, illus., English summary.

Using the variety Gokokuimo of *Ipomoea batatas* the variations in quantities of carbohydrates, proteins and soluble N-fractions in the early stages of top growth were determined. N-compounds, especially proteins, were richer in the apical than basal parts of the vines while the carbohydrates were richer near the base.—From English resumé. —D.B.

CASSAVA AND YAMS

1506 Dufournet, R. and Goarin, P. Note sur la culture du manioc à Madagascar. [**Note on cassava-growing in Madagascar.**] *Riz et Rizicult.* 1957, **3**, No. 1, 15–38, bibl. 17, illus., English and Spanish summaries.

1507 Mason, R. R. **Cassava varieties in Fiji.** *Agric. J. Fiji* 1956, **27**, No. 3/4, 88–93, bibl. 4.

A description is given of 16 cassava varieties grown in Fiji, together with a key for their identification. Varietal trials indicate that Vula Tolu is the most useful early maturing variety in Fiji. Yabia Damu, Coci and Merelesita are heavy yielders, are of good quality and fairly quick-maturing ; Sokobale is useful if the crop is to be left in the ground for a long time.—M.P.

1508 Barrau, J. Les ignames alimentaires des îles du Pacifique Sud. [**The yams used for food in the South Pacific islands.**] *J. Agric. trop. et Bot. appl.* 1956, **3**, No. 7–8, 385–401, bibl. 11, illus. [S. Pacific Comm.]

Information, including synonyms, varieties, vernacular names, geographical distribution and cultural methods, is given on *Dioscorea* spp. used for food in the South Pacific. *D. alata* and *D. esculenta* are the most important cultivated species. *D. nummularia*, *D. hispida* and some varieties of *D. bulbifera* and of *D. pentaphylla* are semi-cultivated. Some wild varieties of *D. bulbifera* and of *D. pentaphylla* provide edible tubers.—E.B.O.

1509 Irving, H. **Fertiliser studies in Eastern Nigeria 1947-51.** *Tech. Bull. 1 E. Reg. Nigeria* [n.d.], pp. 34, bibl. 5, illus., 1 map. [Received May, 1957]

The investigation was concerned mainly with yams and these results have already been published [see *Fld Crop Abstr.* 9 : 888]. It was also shown that fertilizer placement when 66% germination of the yams had occurred resulted in the highest yields. Maize and cassava interplanted to yams benefited from the K and N applied to the main crop. In rice trials, yield responses were obtained to P only, but 2 cwt. ammonium sulphate/ac. significantly increased tillering, particularly in the presence of P.—M.P.

1510 Massal, E. and Barrau, J. **Food plants of the South Sea Islands.** *Tech. Pap. 94 S. Pacif. Comm.* 1956, pp. 51, bibl. 72, illus.

Information is given on the staple and the supplementary food plants of the South Sea Islands. Among the former are : taros and taro-like plants (mainly *Colocasia antiquorum*, *C. esculenta*, *Alocasia macrorhiza*, *Cyrtosperma chamissonis*, *Xanthosoma* spp. and *Amorphophallus campanulatus*) ; yams (*Dioscorea* spp.) ; cassava (*Manihot* spp.) ; and sweet-potato (*Ipomoea batatas*). Among the supplementary food plants are legumes, cereals and the Indian lotus (*Nelumbo nucifera*). A list of vernacular names and a botanical index are given. [See also Abs. 1233 and 1508.]—E.B.O.

FIBRE CROPS

COTTON

1511 Sergueef, M. Différents aspects de la culture cotonnière en U.R.S.S. [**Different aspects of cotton cultivation in the USSR.**] *Cot. et Fibr. trop.* 1956, **11**, No. 1, 87–99 and No. 2, 185–94, illus. [I.R.C.T., Bambari, Ubangi-Chari]

1512 Agrotis, G. **Irrigation of cotton.** *Countryman, Nicosia* 1957, May, 8.

1513 Marappan, P. V. **The effect of environment on yield and quality of cotton.** *Madras agric. J.* 1957, **44**, No. 1, 3–13, bibl. 15. [Agric. Res. Sta., Kovilpatti]

The effect of environment on the economic value of rainfed Karunganni cotton varieties (*Gossypium arboreum*) was studied at Kovilpatti and Coimbatore, which represent respectively the environment of the southern and northern zones of the Tinnies tract. Compared with cotton grown at Coimbatore, that grown at Kovilpatti produced a higher yield of seed cotton, longer fibre, greater

halo length, and a lower weight per fibre, and the fibres were less mature. The quality of the lint was therefore superior to that produced at Coimbatore. The higher yield and quality were attributed to the higher soil fertility, rainfall, and temperature and the lower relative humidity of the southern zone compared with the northern zone.—D.B.

1514 McWhorter, C. G. and Holstun, J. T., Jr. **Progress report on CIPC and diuron for pre-emergence weed control in cotton.** *Proc. 10th S. Weed Conf.* 1957, 31–8, bibl. 1. [Delta Br., Mississippi Agric. Exp. Sta., Stoneville]

Pre-emergence use of CIPC and diuron [rates not specified] and the use of wide, flat, press-wheel planters significantly increased the yields of seed-cotton. Rotary hoeing alone, or with CIPC, provided some control of weeds but tended to be detrimental to crop stands and yields. Resowing (where necessary) after pre-emergence treatment with diuron was safest if the treated areas were thoroughly disced prior to sowing. No cumulative toxicity to other crops was noted after the application of CIPC or diuron in bands, at rates recommended for weed control in cotton.—From authors' summary.

1515 Upchurch, R. P. **The influence of soil-moisture content on the response of cotton to herbicides.** *Weeds* 1957, **5,** No. 2, 112–20, bibl. 10, illus. [N. Carolina Agric. Exp. Sta., Raleigh]

Individual cotton plants were grown in 1-qt. cans in which the soil-moisture content was depleted to 8·3, 33, 67 or 100% of the available supply before being irrigated to the maximum available content. Plants grown on soil mixed with diuron were nearly equal in green- and dry-matter yields, and in height, under all soil-moisture levels. It was inferred that diuron was more toxic under moist than under dry soil conditions. Where no herbicide was mixed with the soil, the high moisture level produced over 50% more dry matter than the drier levels. Plants grown on soil treated with CIPC or DNBP were not influenced by variation in soil moisture more than would be expected from plants not treated with the herbicides.—From author's summary.

1516 Erwin, D. C. **Effect of some fungicides on seedling diseases of cotton in the irrigated desert valleys of southern California.** *Pl. Dis. Reptr* 1957, **41,** No. 4, 324–9, bibl. 7. [Univ. California Citrus Exp. Sta., Riverside]

During 1954, in a test of 11 fungicides and mixtures, PCNB used as a spray emulsion at 2·6 lb. (actual) per acre-row (13,081 ft.) at sowing-time, gave the highest increase in the emergence and survival percentage of cotton in rows previously infected with *Rhizoctonia solani*. In 1956, when 5 insecticide treatments were used and the soil was infected with *R. solani* and *Pythium* sp., only *R. solani* appeared to be pathogenic. Each of the new treatments : PCNB, PCNB + captan, PCNB + zineb, PCNB + ceresan 200 and zineb induced a higher emergence and survival percentage of plants than no treatment.—J.F.C.

1517 Martin, D. F. **What's new in control of cotton insects. Conventional chemicals.** *Proc. Cotton Prod. Conf., Birmingham, Alabama, Dec. 1956* [n.d.], 16–17. [Dep. Entom., Texas A and M Coll., College Sta.]

Recent results in the control of cotton insects by phosphorus insecticides, thiodan and calcium arsenate are discussed. For the control of thrips [*Frankliniella* spp.], 3 applications of dieldrin at 0·1 lb./ac. at weekly intervals were best. For control of the boll weevil [*Anthonomus grandis*], guthion was successful at 0·25–0·5 lb./ac. and the addition of DDT at 0·5–1 lb./ac. or an increased dosage of guthion controlled bollworm. Methyl parathion applied at 0·25–0·5 lb./ac. gave good control of the boll weevil, and, when 0·5–1·5 lb. DDT/ac. was added, of bollworm and the cabbage looper [*Trichoplusia ni*] also. EPN at 0·5 lb./ac. gave good weevil control and was equivalent to 0·34 lb. endrin/ac. Promising control of the leaf perforator [*Bucculatrix* sp.] was obtained by using 0·375–0·5 lb. phosdrin/ac.—J.F.C.

1518 Harris, D. G. and van Bavel, C. H. M. **Root respiration of tobacco, corn and cotton plants.** *Agron. J.* 1957, **49,** No. 4, 182–4, bibl. 7, illus. [N. Carolina Agric. Exp. Sta., Raleigh]

The respiration rates of maize and cotton roots underwent daily fluctuations with the maximum rate generally occurring about 4 p.m. The rates increased with the age of plant, but, measured as CO_2 output per g. of root dry-weight per 24 hr., remained fairly constant. The rates ranged from 488 mg. CO_2 per g. of root per 24 hr. for cotton to 197 mg. for maize. [No temperature region data are given.]—From authors' summary.

1519 King, C. C. and others. **Studies on the boll shedding of the unfertilized ovaries in cotton plant.** [Chinese] *Acta Botanica Sinica* 1956, **5,** No. 1, 69–77, bibl. 19, illus., English summary. [Inst. Pl. Physiol., Academia Sinica]

Heavy fall of young bolls occurred 4 or 5 days after rain, which prevents pollination. It has also been proved that boll-shedding induced by spraying liquid insecticide in the forenoon is more

serious than after spraying in the afternoon. A test to discover whether the unfertilized ovary could develop into a seedless boll showed that unfertilized ovaries develop into parthenocarpic fruits with short fibres. If organic nutrients are adequate, all bolls may develop without pollination and fertilization. It is concluded that in the process of fruit development, stimulative substances (or auxins) function as a factor supplementary to that of organic nutrient supply.—From English summary.—M.H.

1520 KING, C. C. and others. **The role of organic food substances in the boll shedding of cotton plant.** [Chinese] *Acta Botanica Sinica* 1956, **5**, No. 1, 78–102, bibl. 61, illus., English summary. [Inst. Pl. Physiol., Academia Sinica]

The data show that a reduction in boll-shedding was achieved by agricultural techniques which induce intensive translocation of organic food substances towards the boll. Spraying with P, or 'pinching' the plants, together with suitable defoliation, and applying growth-stimulating substances during the flowering period are recommended.—From English summary.—M.H.

1521 ERGLE, D. R. and EATON, F. M. **Aspects of phosphorus metabolism in the cotton plant.** *Pl. Physiol.* 1957, **32**, No. 2, 106–13, bibl. 22, illus. [Texas Agric. Exp. Sta., College Sta.]

Plants of Upland cotton grown in sand and water cultures showed sharply depressed growth at low P-levels above 2·7 ppm. The reproductive growth of plants in sand cultures was inhibited by low P more than was vegetative growth ; the concentrations of reducing sugars and starch were *c.* 4 times greater than at high P-levels and nitrate and protein-N were depressed, whereas soluble organic-N was increased and the percentages of Ca, Mg, K and S were decreased. In sand cultures, the effect of a low P-level was that root growth was depressed less than top growth.—From authors' summary.

1522 MCILRATH, W. J. and PALSER, Barbara F. **Responses of tomato, turnip and cotton to variations in boron nutrition. 1. Physiological responses.** *Bot. Gaz.* 1956, **118**, No. 1, 43–52, bibl. 15, illus. [Dep. Bot., Univ. Chicago]

Turnip and cotton plants, grown in sand culture, were supplied with 0 or 5 ppm. B and each of these 2 groups was treated in 1 of 3 ways : (a) no further treatment, (b) sprayed thrice weekly with 10% sucrose, and (c) sprayed with 10% sucrose and 5 ppm. B. Plants receiving no B exhibited symptoms of B-deficiency and had a lower B content, a lower percentage of total sugar and a higher percentage of starch in their leaves than non-deficient, unsprayed plants. [See Abs. 610.]—From authors' summary.

1523 SOWELL, W. F. and others. **Copper toxicity of the cotton plant in solution cultures.** *Agron. J.* 1957, **49**, No. 4, 206–7, bibl. 6, illus. [Alabama Agric. Exp. Sta., Auburn]

1524 ROUX, J. B. and GUTKNECHT, J. Essais de fumure du cotonnier au Tchad. [**Cotton manurial trials in Chad.**] *Cot. et Fibr. trop.* 1956, **11**, No. 2, 137–52, bibl. 10, illus.

N fertilizers exerted an optimum effect when applied after the first weeding of cotton, i.e. between 30–45 days after sowing and when placed 10 cm. from the rows. Early flowering was stimulated when the N was applied at sowing but not when application was delayed until the seeds had germinated. N fertilizers which did not contain sulphur caused a yellowing of the foliage a fortnight after application, but application of sulphur led to the disappearance of yellowing within 10 days. Farmyard manure gave variable responses probably due to its heterogeneity but kraal scrapings (soil plus excretions) increased yields. Bat guano significantly augmented cotton yields and crushed cottonseed also had an appreciable effect.—M.H.F.

1525 EMPIRE COTTON GROWING CORPORATION. **Progress reports from experiment stations, season 1955-56. Tanganyika Territory, Lake Province.** London, 1957, pp. 21.

The general trend of husbandry results at Ukiriguru and Lubaga followed that of previous years. Consequently it is recommended that on the hill-sand areas of the Province any cattle manure available should be fully used, and where insufficient is available, 100 lb. double superphosphate/ac. should be applied ; residual responses from both will persist for a number of years. An annual application of 100 lb. ammonium sulphate/ac. should be applied at the time of cotton flowering. Land resting is also recommended since in direct and residual responses it is equivalent to a dressing of cattle manure. During the year the variety Uk55 was under multiplication. No strain outyielded Uk51, the variety grown throughout the Province.—From summary.

1526 EMPIRE COTTON GROWING CORPORATION. **Progress reports from experiment stations, season 1955-56. Nyasaland.** London, 1957, pp. 17.

INVESTIGATIONS REPORTED :

Cotton variety trials, pp. 4–7. Albar 51 selections were again the best, and outyielded CLB and CL20 at Chitala by 25–48%. The Albar 51 strains

were intermediate between CLB and CL20 in spinning quality and similar to CLB in jassid (*Empoasca facialis*) resistance. Albar 51–637 had the best over-all record and was being multiplied. At Karonga, in the Northern Province, CLB from the district again outyielded the long-staple upland varieties on trial.—M.P.

FLAX

1527 JORDON, L. S. and DUNHAM, R. S. **Pre-harvest spraying of flax.** [Abstract] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 170. [Dep. Agron., Pl. Genet., Univ. Minnesota, St. Paul] [Received April, 1957]

PP-dibutyl-N,N-diisopropylphosphinic amide at 2 and 4 lb./ac. in 40 gal. of water, significantly reduced the moisture content of mature Marine flax.—From abstract.

1528 INSTITUUT VOOR RASSENONDENZOEK VAN LANDBOUWGEWASSEN, WAGENINGEN. Bericht over rassenkeuze No. 220. Vezelvlas, 1957. [**Choice of varieties. Pamphlet No. 220. Fibre flax, 1957.**] *Ned. VlasInst. Vlugschr. 12. Suppl. 3, Landb Voorl.* 1957, **14**, No. 2, 1–2.

In recent years great changes have taken place in the flax varieties in the Netherlands, the white-flowering Wiera, occupying 91% of the 1956 area, having almost entirely supplanted the old variety Concurrent. Relative figures for straw yield, seed yield and lint content, as determined in the 1956 interprovincial trials, are given for the varieties Wiera, Diana, Solida, Noblesse, Hollandia, Percello, Concurrent, Madonna, Regenboog, Luidenburg 48–24 and L.B.W. 59. A short description of each is appended.—G.M.R.

1529 ROBINSON, R. G. **Flax [weed control in].** [13 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 104–10. [Received April, 1957]

Control of *Setaria* spp. was obtained by the application of TCA at 5 lb./ac. alone or in combination with 2 or 4 oz. MCPA or 2,4-D (amines) to established stands of flax ; by pre-emergence treatment with dalapon at 1 lb., CDAA at 3 or 6 lb. and CDEA at 6 lb./ac. There was little or no crop injury from these treatments. In general, MCPA was less injurious to flax than 2,4-D at equal rates and in similar formulations.—From summary.

1530 CHUBB, W. O. (Summarizer). **Flax [weed control in].** [7 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 90–4.

The experiments reported were mainly concerned with the control of *Avena fatua* and *Setaria viridis* in flax. Among the treatments investigated, pre-emergence application of CDAA at 8–12 lb./ac. gave good control of both weeds without injuring the flax. TCA applied after emergence at 6 lb./ac. controlled *S. viridis* but injured the flax ; crop yields, however, were increased.—M.P.

1531 FRIESEN, G. **The effect of several herbicides for the control of wild oats in cereal crops and flax.** *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 53. [Manitoba Agric. Coll., Winnipeg]

[See also Abs. 726.] Data from the 1956 experiments are presented. CDAA in liquid and granular form at 2–4 lb./ac. showed promise for control of *Avena* sp. without damaging the flax.—M.P.

1532 SEXSMITH, J. J. **Effects of 2,4-D ester on Russian thistle [*Salsola pestifer*] in flax.** *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 37. [Agric. Exp. Fm, Lethbridge, Alberta]

The butyl ester of 2,4-D at 6 oz. a.e./ac. applied *c.* 30 days after sowing the crop gave the best all-round results.—M.P.

1533 SEXSMITH, J. J. (Summarizer). **Green foxtail and other weedy grasses.** [5 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 52–4.

In post-emergence experiments, TCA (Na) at 2–8 lb./ac. and dalapon at 1–4 lb./ac. gave excellent control of green foxtail (*Setaria viridis*). The chemicals were applied when the flax was 3 in. tall and the weeds at the seedling to 5-leaf stage. The heavier rates of dalapon reduced flax yields, whereas TCA appeared to increase yields. Pre-emergence treatments showing promise were : dalapon (6 and 12 lb./ac.), TCA (7·5 and 15 lb./ac.) and DCU (10 lb./ac.).—From *Weed Abstr.* 6 : 580.

1534 FRIEDERICH, J. C. Bestrijding van de parasitaire kiemschimmels, die met het zaailijnzaad overgaan. [**Control of seed-borne fungous diseases of flax.**] *Meded. NAK* 1957, **13**, No. 10, 102. [Netherlands Flax Inst.]

Recent experiments have shown that seed disinfection, using a mixture of TMTD and mercury, gives the best results.—G.M.R.

1535 MILLIKAN, C. R. **Phosphate level in the substrate and different day and night temperatures in relation to the growth of flax.** *J. Aust. Inst. agric. Sci.* 1957, **23**, No. 1, 51–6, bibl. 6, illus. [Dep. Agric., Melbourne, Victoria]

1536 COLEMAN, R. G. **The effect of sulphur deficiency on the free amino acids of some plants.** *Aust. J. biol. Sci.* 1957, **10**,

No. 1, 50–6, bibl. 18, illus. [Div. Pl. Industr., Pl. and Soils Lab., Brisbane]

A semi-quantitative comparison was made of the free amino acids of flax (*Linum usitatissimum*) and barley, var. Spratt Archer, grown in culture solution with and without S.—M.P.

KENAF

1537 Lamrock, J. C. **Notes on kenaf "*Hibiscus cannabinus*" production in Cuba and Florida.** *Agric. J. Papua* 1954, **9**, No. 1, 6—12. [Dep. Agric., Morobe Distr.] [Received June, 1957]

1538 Valera, F. O. **Effect of harvesting kenaf at different stages of maturity on the yield and quality of the fiber.** *Philipp. Agriculturist* 1957, **40**, No. 9, 453–9, bibl. 2, illus. [Cent. Agric. Exp. Sta.]

The highest yield and greatest strength of dry fibre were obtained from kenaf [*Hibiscus cannabinus*] harvested 123 days after sowing ; at this stage plants with 8–10 capsules were in full bloom and the bark could still be separated easily from the wood. Fibres obtained from plants harvested 103–123 days after sowing had similar softness, brightness and lustre while those from plants over 123 days were dull brown and very coarse.—From author's abstract.

OIL CROPS

LINSEED

1539 Friederich, J. C. Verslag en tevens eindrapport over de resultaten van de proeven met olierlas in de jaren 1950 t/m 1954. [**Final report on linseed trials, 1950-4.**] *Meded. 29 Ned. Vlasinst., Wageningen* 1956, pp. 97, bibl. 74, English summary.

Although, chiefly owing to the withdrawal in 1954 of the Government's price guarantee for linseed, the growing of this crop has practically ceased in the Netherlands, a full report on the experiments made from 1950 to 1954 is presented in case cultivation should again become profitable. Causes contributing to the disappearance of linseed-growing are : the considerable risk of weather damage during flowering and ripening ; the difficulties encountered in weed control, harvesting and threshing ; and the lack of an economic method for processing the straw. In varietal trials, the following varieties gave the highest seed yield : B5128, Dachnfeldt, Valuta, La Prévision 18, Otöfte 59/41, Endress Ollein and Pajbjerg Klein 18. In 1953 and 1954 the varieties Trifolium and Pastel gave a strikingly high seed yield. The highest oil content was found in Dachnfeldt and Valuta, and best quality oil in La Prévision 18. The average yield of seed was 300 kg. higher in clay than in sandy soils, but was largely dependent on favourable weather conditions during flowering and ripening. Cereals appeared to be the best crops to precede linseed. An average of 45 kg. N was found sufficient for clay soils and a somewhat lower amount for sandy soils. Too heavy an application of N caused lodging at an early stage of development. Other findings were : optimal time for sowing, the first weeks in April ; optimal time for harvesting, the first weeks in August ; seeding rate, 60–80 kg. per ha. in 20-cm. drills recommended for clay soils, with a rather higher rate for sandy soils ; seed disinfection with a product containing TMTD is advisable ; the all-essential weed control is best effected by treatment, after hoeing, with products containing DNC, DNBP, MCPA or DNBP + MCPA ; harvesting (early enough to avoid losses from attack by *Alternaria*) should be done by a self-binder or by a grass-mower, the crop being subsequently dried in stooks and on frames or racks ; threshing should be done by stationary machines.—G.M.R.

1540 Krüger, H. Chemische Unkrautbekämpfung im Öl- und Faserlein. [**Chemical control of weeds in flax grown for oil and for fibre.**] *Dtsch. Landw.* 1957, **8**, No. 5, 231–5, bibl. 15, illus. [Inst. Acker- u. Pflbau, Martin-Luther Universität, Halle-Wittenberg, E. Germany]

In an oil-flax crop heavily infested with *Sinapis alba* and also infested with *Thlaspi arvense*, *Lamium amplexicaula*, *Chenopodium album* and *Stellaria media*, the weeds were effectively controlled by : 0·4–0·5% DNC in 600 l. water per ha., when the linseed crop was 6–10 cm. high and the weeds were in the cotyledonary- to 4-leaf stage ; or by 0·6–0·8 kg. MCPA in 400 l. water per ha. when the crop was 10–15 cm. high. In weed-infested, fibre-flax fields the same chemicals may be used on condition that the temperature is not high. 2,4-D should not be used because it damages the fibres.—D.B.

1541 Cruickshank, I. A. M. **A chromatographic analysis of the free amino-acids, organic acids and sugars in flax (*Linum usitatissimum*).** *J. Sci. Fd Agric.* 1957, **8**, No. 1, 26–30, bibl. 18, illus. [DSIR Low Temp. Res. Sta., Cambridge]

GENERAL

1542 Piquemal, M. Possibilités de développement et d'amélioration des cultures oléagineuses annuelles en Algérie. [**Possibili-**

ties for development and improvement of annual oil crops in Algeria.] *Bull. Renseign. agric.* 1956, No. 30, pp. 11. [Sta. Cent. Essais Sem. et Amélior. Pl., Maison Carrée, Algiers]

1543 Poliakoff, J. Les oléagineux du Brésil. [**Oil crops in Brazil.**] *Oléagineux* 1956, **11**, No. 10, 653–9, bibl. 26 and **12**, No. 3, 171–8, bibl. 37, illus. [Inst. Rech. Huiles et Oléagineux, Paris]

1544 Lindberg, J. E. and others. Bestämning av oljehalten i enskilda odlareleveranser av oljeväxtfrö. **Oil-content determination of individual oil seed lots from farmers.** *Sverig. Utsädesfören. Tidskr.* 1956, **66**, No. 5, 281–301, bibl. 29, illus., English summary.

A reproducible method for determining the oil content in oil-seed lots is described. The adoption of this method for determining oil content has enabled payment for oilseed to be based upon oil content as well as on moisture content, etc.—J.K.L.

LAND USE, SURVEYS AND MANAGEMENT

1545† Ripley, P. O. **Potential agricultural production in Canada.** *Nutr. Abstr. Rev.* 1957, **27**, No. 2, 291–300, bibl. 5, 1 map.

1546† Barret, J. and others. Contribution à l'étude de la mise en valeur des sols sableux. [**A contribution to the study of the improvement of sandy soils.**] *Bull. tech. Inform.* 1957, No. 117, 111–41, bibl. 60, illus.

An account is given of results obtained in improving the Landes of Gascony, France, including information on crops grown (mainly cereals, potatoes, oil crops and forage crops) and crop rotations.—E.B.O.

1547† Swynnerton, R. J. M. **A plan to intensify the development of African agriculture in Kenya.** 1955, pp. vi + 75, Nairobi ; Govt Printer, Sh. 1/50. [Received April, 1957]

The 5-year plan which began on 1 April, 1954, and which has since come to be known as the ' Swynnerton Plan', is described. It deals with : the intensification of African agricultural development ; African lands of high potential ; semi-arid pastoral areas ; irrigation and swamp-reclamation ; settlement, ranching and tsetse reclamation schemes; and the economics of the plan.—M.P.

1548† African Land Development Organization. **African land development in Kenya. July 1955-June 1956.** [n.d.], pp. 37, illus. [Nairobi] [Received May, 1957]

This report follows the pattern of previous issues in reviewing the work done by ALDEV in the different districts of Kenya.—M.P.

1549† Portères, R. L'agriculture flottante congolo-tchadienne des savanes de l'Oubangui. [**The fluctuating agriculture of the Congo-Chad in the savannahs of the Ubangi.**] *J. Agric. trop et Bot. appl.* 1956, **3**, No. 11, 761–8, bibl. 23.

Some aspects of rural economy in relation to crop production in the Ubangi are discussed in connexion with an article by R. Guillemin [see *Fld Crop Abstr.* 10 : 695]. The difficulties and uncertainty of agriculture in this region are stressed.—E.B.O.

1550 De Fina, A. L. and others. Difusión geográfica de cultivos índices en la provincia de Tucumán y sus causas. [**Geographical distribution of index crops in Tucuman province and its causes.**] *Publ. 50 Min. Agric. y Ganad. Argentina* 1956, pp. 47, maps.

This work is part of an agro-ecological survey of Argentina, based mainly on the presence (or absence) and behaviour of 18 index crops which include cotton, maize, wheat, oats and barley. The localities surveyed in Tucuman were 56. A map, drawn for each crop, shows where the crop is grown in the province and the importance of its production. Cotton is not grown in Tucuman, maize is grown in all localities but one, wheat in less than half the localities, forage oats and forage barley in almost all. There is also an agro-climatic map of the province.—E.B.O.

1551† Oxford University Press. **The USSR and Eastern Europe.** *Oxford Regional Economic Atlas.* Prepared by the Economist Intelligence Unit and the Cartographic Department of the Clarendon Press, Oxford. 1956, pp. 134, Oxford Univ. Press, 26 × 19 cm., 42s.

FARMING SYSTEMS AND PRACTICES

1552 Phillis, E. **Cultivation practices in relation to yield on a Northern Territory soil.** *Aust. Pl. Nutr. Conf. Vol. 1 1956*, Melbourne, 441–9, bibl. 3.

The effects of variation in time- and depth-of-ploughing on the yield of seed-cotton, groundnuts and sorghum are described. Deep (6–7 in.) or shallow (2·5–3 in.) ploughing in the dry or wet season were compared with wet tyne cultivation. In one experiment, the effects of deep dry and deep wet ploughing were additive, for all crops. Most, but not all, of the experiments showed beneficial effects of deep ploughing on crop yields ; responses of the crops to the treatments were variable.—M.P.

1553 Kreutz, W. and others. Windschutz und Landwirtschaft. [**Windbreaks and agriculture.**] *Arb. dtsch. LandwGes. Frankfurt/Main* 1956, **37**, pp. 104, bibl. 49, illus.

The symposium on windbreaks, held in Germany in 1955 under the auspices of the Department of Land- and Crop-cultivation of the Deutsche Landwirtschafts-Gesellschaft (German Agricultural Society), summarized recent work on the subject. This symposium included papers on : windbreaks as a climatic factor, the contribution of a weather service to the layout of windbreaks, and the tree species to use, taking into account farm management, soil conservation and animal shelter.—D.B.

1554 Hanke, E. and Kaiser, H. Untersuchungen über die Auswirkungen von Windschutzstreifen auf den Ertrag von Hafer, Hafer-Gerste-Gemisch und Zuckerrüben im Jahre 1955. [**The effect of windbreaks on yields of oats, an oat/barley mixture and sugar-beet in 1955.**] *Z. Acker- u. Pflbau* 1957, **103**, No. 1, 90–110, bibl. 5, illus. [Windschutzmessdienst des Wetteramtes Essen des Deutschen Wetterdienstes und Landwirtschaftskammer Rheinland]

At the Lehr und Versuchsgut Wahn, Rheinland, oats were grown on the western, and an oat/barley mixture on the eastern, side of a windbreak. This was 2·5 m. high and consisted of wooden posts and coconut fibre. It was placed N.W./S.E. at right angles to the prevailing wind. A portion of the field had no windbreak. On the west side of the fence, the grain yield of oats at sampling points up to a distance of 30 times the height of the fence was, on an average, 9·2% higher than the average yield from the unprotected area at the side of the windbreak. On the east side of the windbreak, the yield of straw of the oat/barley mixture was, up to a distance of 15 times the height of the windbreak, on an average, 10·4% higher than the average from the unprotected parts at the side of the windbreak. On the other hand, the straw yield on the west side and the grain yield on the east side of the windbreak were little different from the yields obtained from unprotected sampling points at the side of the windbreak. These results are explained by the fact that during early growth-stages in May, the prevailing wind was S.W. ; in June the wind came equally from all directions ; whereas in July, during the ripening stages, the wind was chiefly from the N.E. The experiment with sugar-beet was carried out on Gut Ollesheim bei Düren, the object being to investigate yields on the leeward side at different distances from the windbreak. The barrier lay in a N.W./S.E. direction at right angles to the prevailing wind and consisted of 2 rows of poplar trees 6 m. apart, three rows of hornbeam trees 0·5 m. apart with intervening wild cherry, wild plum, red oak, sycamore, ash and false acacia (*Robinia pseudoacacia*). The windbreak was 306 m. long, 7 m. wide and 8 m. high. Beet yield and sugar yield decreased with distance from the windbreak. Up to a distance of 28 times the height of the windbreak the yield of beet was 5·6% higher than at distances of 32–60 times the height. Sugar yield was 8·5% higher. The percentage of noxious N and soluble ash was 5% lower near the windbreak than at a distance of 44–60 times the height of the windbreak. [See also Abs. 591.]—D.B.

1555 Suter, K. Die Windverhältnisse im Bereich von Windschutzstreifen. [**Wind conditions within the protection of windbreaks.**] *Schweiz. landw. Mh.* 1957, **35**, No. 5, 285–91, bibl. 3, illus.

This account summarizes Nageli's experiments with different types of windbreak in treeless areas of the Rhine and Rhone valleys in Switzerland.—D.B.

1556 Fribourg, H. A. **Comparison of leguminous green manures with inorganic nitrogen in rotations with corn.** [Abstract] *Iowa State Coll. J. Sci.* 1956, **30**, No. 3, 358–9. [Dep. Agron., Iowa State Coll.]

Maize yields after green manure were generally proportional to the total N-content, and hence to the total growth, of the legumes. Leguminous-N was 65–85% as efficient as ammonium-nitrate N in increasing maize yields. Freshly cut lucerne as green manure was better than equivalent rates of red clover, but less efficient than ammonium-nitrate N in increasing yields.—From abstract.

1557 Hudson, J. P. **A basis for timing crop**

irrigation. *Rep. Nottingham Univ. Sch. Agric. 1956* 1957, 39–43, bibl. 7.

1558 Chambon, R. and Leruth, A. Paysannat et colonat dans le District du Tanganika. [**Peasantry and colonization in Tanganyika Territory.**] *Bull. agric. Congo belge* 1957, **48,** No. 2, 279–315, bibl. 5, illus.

SOIL AND WATER CONSERVATION

1559 Rider, N. E. **Water losses from various land surfaces.** *Quart. J. roy. Meteorol. Soc.* 1957, **83,** No. 356, 181–93, bibl. 11, illus. [Met. Office Lond. and Sch. of Agric., Univ. of Cambridge]

The author considers that the concept of equal potential transpiration irrespective of crop size or character should be approached with caution. This conclusion is supported by observations made over bare soil, brussel sprouts, peas and grass.—C.L.S.

1560 Lawes, D. A. **Preliminary report on soil-water-crop relationship at Samaru, Northern Nigeria, 1956.** *Emp. Cott. Gr. Rev.* 1957, **34,** No. 3, 155–60.

The following surface treatments are under comparison for amount of rainfall absorption : (a) a cover of 2–4 in. of dead-grass mulch ; (b) 3 in. of groundnut-shell mulch ; (c) 2–3 in. of granite chips ; (d) *Cynodon dactylon* (planted May 1956) ; (e) surface soil removed and replaced by transported soil of superior crumb structure treated with krilium at 1 lb./27 sq. ft. ; (f) *in situ* soil treated with krilium at 1 lb./27 sq. ft. ; (g) bare soil hoed frequently ; (h) bare soil undisturbed the whole season. Preliminary results indicated that rainfall penetration was greatest in the mulched soils, and was least on the undisturbed bare soil. Groundnut-shell mulch was also shown to increase substantially yields of sunflower seed and seed cotton, compared with unmulched plots.—M.P.

1561† Water Conservation and Irrigation Commission of New South Wales. **Water conservation and irrigation in New South Wales.** *Publ. Water Conserv., Irrig. Comm. N.S.W.* [1956], pp. 40, illus. [Received March, 1957]

1562† Clayton, E. E. S. **Soil erosion and its control [in N.S.W.].** *Publ. Rural Bank N.S.W. (Rev. Ed.)* 1954, pp. 91, illus. [Received March, 1957]

1563 Condon, R. W. and Stannard, M. E. **Erosion in western New South Wales. 3. Forms of water erosion.** *J. Soil Conserv. N.S.W.* 1957, **13,** No. 2, 68–74, illus.

See also Abs. 700 and 1148.

WEEDS, WEED CONTROL AND WEEDKILLERS

Where weeds are specific to a crop, see under the crop concerned.

1564 Boyko, Elizabeth. ***Galinsoga parviflora* Cavan. A new weed-immigrant in Israel.** *Spec. Bull. 2 Agric. Res. Sta., Rehovot, Israel* 1956, pp. 17, bibl. 9, illus.

See *Fld Crop Abstr.* 7 : 271.

1565† Derscheid, L. A. and others. **Preliminary studies on pollination and seed germination and maturation of thistles.** [Abstract] *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 10–11. [S. Dakota State Coll.]

Cirsium arvense and *Sonchus arvensis* were investigated. —M.P.

1566† Steinbauer, G. P. and Grigsby, B. **Some correlations between germination and dormancy of weed seeds in the laboratory and in the field.** *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 35–6. [Michigan Agric. Exp. Sta., E. Lansing]

1567† Steinbauer, G. P. and Grigsby, B. **Interaction of temperature, light and moistening agent in the germination of weed seeds.** [Abstract] *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 9–10. [Michigan Agric. Exp. Sta., E. Lansing]

The germination of 92 species in 15 families was studied in order to develop a method of determining weed-seed viability by laboratory germination. By proper manipulation of temperature, light and the nature of the moistening agent, it was found possible to obtain over 90% germination of nearly all the species.—From abstract.

1568† Ingle, M. and Rogers, B. J. ***In vitro* sprouting of Johnson grass rhizomes.** [Abstract] *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 32–3. [Dep. Bot., Pl. Path., Purdue Univ., Lafayette, Ind.]

Isolated segments of *Sorghum halepense* rhizomes bearing buds were cultured on sterile, moistened vermiculite in order to study the effect of environmental factors and chemicals on rhizome-bud sprouting. Preliminary results showed that diurnal variations in temperature promoted sprouting, and that increases in temperature, at least up to 90°F., increased bud sprouting. Dalapon at 35 g./l. almost completely inhibited sprouting when rhizomes were soaked in it for 10 min. MH at 3·2 and 1·6 g./l. gave 100 and 70% inhibition, respectively. —From abstract.

1569† Birch, W. R. **The seeding and germination of some Kenya weeds.** *J. Ecol.* 1957, **45**, No. 1, 85–91, bibl. 3. [Molo Grassland Res. Sta.]

Among the common arable weeds of the Kenya Highlands above altitudes of about 8300 ft. (2530 m.) are spurrey (*Spergula arvensis*), cranesbill (*Geranium simense*) and strapwort (*Corrigiola littoralis*). Of these spurrey is the worst, having spread greatly during the last 10 years on the acid and lime-deficient soils. The work reported here was done at the Molo Grassland Research Station (altitude 9000 ft., lat. 0°20′S., long. 35°41′E.) in 1953 and 1954, with the object of obtaining information on the germination behaviour of arable weeds under field conditions. In spurrey the main burst of germination occurred at the beginning of the rainy season ; subsequent germinations depended on rainfall. Fresh seed started germinating more quickly than seed which had survived field burial for 2 years. When sown shallow, fresh seed apparently finished its germination in 2 years.—From author's introduction and summary.

1570 Stearns, F. and Kutschera, L. **Ecological relationships of weed communities in northwestern Indiana.** [Abstract] *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 34–5. [Agric. Exp. Sta., Purdue Univ., Lafayette]

Presence data for weed species in maize and soya-bean fields on a variety of soils are tabulated. The crop grown had a quantitative but not a qualitative effect on weed composition, whereas soil-texture, -fertility and -water-holding capacity did affect the composition of the weed communities.—From abstract.

1571† Lefèvre, P. Influence du milieu et des conditions d'exploitation sur le développement des plantes adventices. Effet particulier du pH et de l'état calcique. [**Influence of the environment and of cultural conditions on the development of adventitious plants. Particular effect of the pH and of the lime status (of the soil).**] *Ann. Inst. nat. Rech. agron., Paris Ser. A. Ann. agron.* 1956, **7**, No. 3, 299–347, bibl. 30, illus., English, German and Russian summaries. [Sta. Agron., Amiens, France]

The influence of factors, other than soil pH, on the development of adventitious plants is examined. These factors are : soil type, soil moisture, climate, seed viability, man (mainly crop rotations, manuring and cultivation). Information is given on the principal weeds found in Picardy in hoed crops, cereals, colza, lucerne, clover, sainfoin, and mown or grazed natural grasslands. A study was made of the principal adventitious plants in Picardy in relation to the lime status of the soil. Lists are given, compiled from the literature, of plants considered to be indicators of acid soils or of alkaline soils, and of plants which are indifferent to soil reaction. It is concluded that the relationship between soil pH and adventitious plants is a loose one, the value of certain plants as indicators having been over-estimated and that of factors other than the pH under-estimated. Only *Chrysanthemum segetum*, *Rumex acetosella* and the ferns clearly indicate a requirement for lime, while *Raphanus raphanistrum* and *Polygonum aviculare* are moderate indicators. Observation of adventitious plants is considered to be of value mainly for checking the uniformity of a field or of the farm.—E.B.O.

1572† Mann, H. H. **Weed herbage of slightly acid arable soils as affected by manuring.** *J. Ecol.* 1957, **45**, No. 1, 149–56, bibl. 3. [Woburn Exp. Sta.]

See also *Herb. Abstr.* 9 : 943.

1573† Le Tourneau, D. and Heggeness, H. G. **Germination and growth inhibitors in leafy spurge foliage and quackgrass rhizomes.** *Weeds* 1957, **5**, No. 1, 12–18, bibl. 8, illus. [Minnesota Agric. Exp. Sta., St. Paul]

Aqueous extracts of fresh or dried foliage of leafy spurge (*Euphorbia esula*) and of the rhizomes of quackgrass (*Agropyron repens*) each inhibited the root growth of pea and wheat seedlings. Increased concentrations inhibited coleoptile growth and germination of wheat.—From authors' summary.

1574 Ministry of Agriculture, Fisheries and Food, England and Wales. **Knotgrass and allied weeds [*Polygonum* spp.].** *Advis. Leafl. 432 Minist. Agric., Fish., Fd, England and Wales* 1956, pp. 5, illus.

1575 Sand, P. F. (Summarizer). **Hoary cresses and bur ragweed.** [5 abstracts] *Res. Rep.*

12th N. Cent. Weed Contr. Conf. 1955, 11–13. [Received April, 1957]

In Nebraska, the best control of bur ragweed (*Franseria tomentosa*) was obtained with DB granular and DB soluble [sodium-borate mixtures of 2,4-D] at 4 lb./sq. rod, sodium chlorate at 5 lb./sq. rod and concentrated borascu [sodium borate] at 12 lb./sq. rod. Amino triazole at 6 or 12 lb./ac. applied when hoary cress (*Cardaria draba*) was at the bud stage and again when regrowth occurred gave 99–100% kill. Hardly any regrowth occurred in 1955 after application of 2,4-D at 6 lb./ac. to hoary cress at the bud stage the previous year.—From summary.

1576† KRALL, J. L. and others. **Chemicals and competitive crops for the control of leafy spurge in Central Montana.** *Bull. 510 Montana Agric. Exp. Sta.* 1955, pp. 15, illus. [Received Dec., 1956]

For the control of leafy spurge (*Euphorbia esula*), annual applications of 2,4-D (isopropyl ester) at 1 lb. a.e./ac. were effective in the presence of competing grass (especially *Agropyron intermedium*). Emergence- or post-emergence-applications of 2,4-D depressed the establishment of most grass species studied but caused no damage to seedlings 4–6 in. tall. The delayed-cultivation type of fallow, treated with 0·75 lb. 2,4-D in alternate years, resulted in 99% control after 4 years.—J.F.C.

1577† DERSCHEID, L. A. (Summarizer). **Leafy spurge and Russian knapweed.** [18 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 14–23. [Received April, 1957]

Variable results were obtained from the use of 2,4-D and MCPA formulations and amino triazole on leafy spurge (*Euphorbia esula*). Summer and autumn applications of 2,4,5-TP at 20–40 lb./ac. completely eliminated leafy spurge ; 2,3,6-TBA was best at 2 or 4 lb./ac. and gave 75% kill ; the surviving spurge plants did not produce seed. Concentrated borascu was amongst the soil sterilants used ; in most cases it almost eliminated *E. esula*.—From summary.

1578 MCHENRY, W. B. **An evaluation of dalapon for Johnson grass control at varying rates and application dates.** *Proc. 9th Calif. Weed Conf.* 1957, 25–9. [Univ. California, Davis]

Stands of Johnson grass [*Sorghum halepense*] were reduced to less than 1% ground cover by 3 applications (early-, mid- and late-season) of dalapon at 10–30 lb. in 160 gal. of water/ac. Where 2 sprayings were made, initial applications at mid-season followed by retreatments in late-season gave best results.—From author's summary.

1579 ROBINSON, E. L. **Herbicide studies : 2. Alpha-alpha-dichloropropionic acid and 3-amino-1,2,4-triazole as herbicides on Johnson grass.** *Diss. Abstr.* 1956, **16**, No. 11, 1991. [Ohio State Univ.]

Applied at 2 and 8 lb./ac., respectively, amizol (amino triazole) and dalapon, in combination with ploughing but not cultivation, gave 87% reduction in the top growth of Johnson grass [*Sorghum halepense*] as observed 4 months later. Applied thrice at weekly intervals to Johnson grass in flower, dalapon at 10 lb./ac. caused 100% kill and amizol at 8 lb./ac. caused 90% kill of the top growth. Applied 1 and 2 weeks before sowing, 4 or 8 lb. of amizol/ac. caused no damage to maize, but 5 or 10 lb. of dalapon/ac. caused severe injury. —J.F.C.

1580† SANTELMANN, P. W. and MEADE, J. A. **Preliminary results in controlling Johnson grass.** *Proc. 11th N.E. Weed Contr. Conf.* 1957, 169–72. [Maryland Agric. Exp. Sta., College Park]

Single treatments with dalapon at 15–40 lb./ac. killed the top-growth of *Sorghum halepense*, but the plants recovered completely. Two treatments, 10–40 days apart, with 15–40 lb. dalapon/ac. or dalapon + amino triazole (15–30 + 3–8 lb./ac., respectively,) were more satisfactory.—M.P.

1581 FLETCHALL, O. H. (Summarizer). **Johnson grass and Bermuda grass.** [5 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 35–8. [USA] [Received April, 1957]

Results of trials for the chemical control of *Sorghum halepense* are reported.—M.P.

1582† ANDERSON, L. E. **Chemical control of Johnson grass.** [Abstract] *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 32. [Kansas Agric. Exp. Sta., Manhattan]

Among the herbicides tested in 1956 and which gave excellent control of *Sorghum halepense* were : dalapon applied when the weed was at the 6-in. stage as a single treatment of 20 lb./ac. or two applications of 10 lb./ac. each ; 2,2,3-trichloropropionate at 10 lb./ac. ; erbon at 1 pt./sq.rod. Additional cultivation enhanced the effectiveness of the treatments.—From abstract.

1583 REA, H. E. **The control of Johnson grass in row crops.** *Proc. 10th S. Weed Conf.* 1957, 154–7, bibl. 3. [Texas Agric. Exp. Sta.]

1584† PRIDHAM, A. M. S. **Response of quackgrass, *Agropyron repens*, to amino triazole when applied directly to grow-**

ing plants. *Proc. 11th N.E. Weed Contr. Conf.* 1957, 178–80. [Cornell Univ.]
Baron, at a dilution of 1 : 10 applied at the rate of 100 gal./ac., was the only herbicide in the present tests which reduced regrowth from stolons when mature *A. repens*, uncut, was treated at the seed-head stage.—M.P.

1585† Buchholtz, K. P. and Peterson, D. R. **Control of quackgrass with dalapon.** *Down to Earth* 1957, **12,** No. 4, 4–5, bibl. 2, illus. [Univ. Wisconsin, Madison]
For the control (rather than eradication) of *Agropyron repens*, application of dowpon (Na dalapon containing 74% a.e.) at the rate of 5 lb./ac. in spring or 10 lb./ac. in autumn was satisfactory. [See *Fld Crop Abstr.* 9 : 1368.]—From authors' summary.

1586† Helgeson, E. A. (Summarizer). **Quackgrass.** [26 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 38–51. [Received April, 1957]
Dalapon, MH, amino triazole, DCU and 2,3,6-TBA at rates of 2–12 lb./ac., applied to vigorous foliage of *Agropyron repens*, gave poor to excellent control in the current season. In one instance, cropping to soyabeans appreciably enhanced the control obtained. Soil treatments with CMU, PDU & TCA gave variable results, and at high concentrations their residual effect was toxic for several years.—From summary.

1587† Carder, A.C. (Summarizer). **Quack or couch grass** [*Agropyron repens*]. [14 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 1–10.

1588 Phillips, W. M. (Summarizer). **Field bindweed.** [3 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 9–10. [USA] [Received April, 1955]
The results from a range of herbicides for the control of field bindweed (*Convolvulus arvensis*) are given.—M.P.

1589† Best, K. F. (Summarizer) and McCurdy, E. V. **Field bindweed.** [2 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 29.
Following the cultural practices recommended for fallow, treatments with a low volatile ester of 2,4-D at 2 lb./ac., or with DB granular at 2 lb./100 sq. ft., gave complete eradication of *Convolvulus arvensis*. In another trial, 2,4-D (ester) at 12 oz./ac. was sprayed in August to previously cultivated land. Wheat was sown the following spring and top growth of the weed sprayed again. By the autumn there was a marked reduction in the prevalence of field bindweed.—From abstracts.

1590 Thurston, Joan M. **Weed studies. Wild oats.** *Rep. Rothamsted Exp. Sta. 1956* Harpenden, 1957, 80–1.
The percentage germination of *Avena ludoviciana* seed was unaffected by sowing with wheat, barley or rye. Dormancy of the first seeds from spikelets was unusually high, but was slightly reduced by increased competition with the cereal crops, especially when sown early with a low N supply. Nearly all the 2nd seeds from spikelets were dormant. In several types of *A. ludoviciana* studied, germination ceased around the end of March and began again in late October. Six selections of *A. fatua* gave a spring peak of germination, and 2 selections gave a winter peak corresponding in periodicity to the late-germinating types of *A. ludoviciana*. Different temperatures prior to, and during, germination had a differential effect on germination of 1st and 2nd seeds of *A. ludoviciana*.—M.P.

1591 Leggett, H. W. (Summarizer). **Wild oats.** [37 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 34–51.
Reports dealing with cultural and cropping practices and chemical methods for the control of *Avena fatua* in barley, oats, wheat and flax are presented.—M.P.

1592 Helgeson, E. A. and Green, J. G. **New weapon against wild oats.** *Bi-mon. Bull. N. Dakota Agric. Exp. Sta.* 1957, **19,** No. 4, 121–2.
In 2 tests on dormant seed of wild oats [*Avena* sp.], distilled water caused 12 and 7% germination and 50 ppm. gibberellic acid 86 and 88%, respectively, after 10 days.—J.F.C.

1593 Dunham, R. S. (Summarizer). **Annual, winter annual, and biennial weeds.** [68 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 52–82. [Received April, 1957]
Of the abstracts submitted under this heading, 39 reported studies on *Avena fatua*. Other weeds studied included :—*Setaria lutescens, Matricaria inodora, Silene cserei, Sinapis arvensis, Chenopodium* spp., Russian thistle [*Salsola kali*], *Bromus tectorum*, a number of annual grasses, and annual weeds growing in oats.—From summary.

1594 Forsberg, D. E. (Summarizer). **Wild buckwheat.** [21 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 55–64.
The abstracts deal mainly with cultural and chemical control of *Polygonum convolvulus* in barley, wheat, oats and flax. Best results were obtained from 2 applications of 5 oz. a.e. 2,4-D (ester)/ac. applied at the 1st- and 2nd-true-leaf stages. MCPA (ester) applied similarly was also good. Of the

pre-emergence sprays, 2,4-D (2 lb./ac.) gave the best results and did not reduce grain yields.—From *Weed Abstr.* 6 : 609.

1595 Sterling, G. R. (Summarizer). **Toadflax** [14 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 20–6.

Black fallow and fallow-tillage reduced *Linaria vulgaris* by 96–98%. Tillage alone gave better control than alternate tillage and spraying of fallow with 2,4-D or amino triazole. After 3 seasons' application of 2,4-D (butyl ester) at 1–4 lb./ac. at the late bud stage, there was less than 1% survival of the weed ; no viable seed was produced in any chemically treated plot. 1–2 lb. DB granular/ac. gave 97–98% control. Polyborchlorate (3–5 lb./100 sq. ft.) and borascu (5 and 7 lb./100 sq. ft.) gave complete kill for more than 2 years after application.—From *Weed Abstr.* 6 : 602.

1596† Friesen, H. A. (Summarizer). **Toadflax and other perennial herbaceous weeds.** [19 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 24–34. [Received April, 1957]

Of 19 abstracts summarized, 13 are concerned primarily with the control of toadflax (*Linaria vulgaris*), and the rest with the control of *Allium vineale*, *Equisetum arvense*, *Silene vulgaris* and tanweed (*Polygonum coccineum*). Intensive tillage of fallow, alternated regularly with a grain crop, was most successful against toadflax on arable land. In general, herbicides were more effective when combined with tillage than when applied alone to toadflax.—From summary.

1597 Louis-Marie (Père). La linaire au Canada. [***Linaria* in Canada.**] *Rev. d'Oka* 1957, **31**, No. 1, 1–13.

The paper consists of : (1) a review of earlier Canadian publications on the control of *Linaria vulgaris* by crop rotation, 2,4-D, and competition with other plants ; (2) a discussion of the geographic distribution of *L. vulgaris* and the possible means of seed dispersal ; and (3) some observations on biological control with *Brachypterolus pulicarius*, *Aphrophora spumata* and *Gymnaetron antirrhini*.—D.B.

1598† Hopkins, W. L. **Cattail and tule control.** *Proc. 9th Calif. Weed Conf.* 1957, 29–33.

The results are outlined of a series of tests in which amino triazole, dalapon and gamet (amino triazole salt of MCPA) were used for the control of cattails [*Typha* spp.] and tule [*Scirpus acutus*] in Fresno County. A survey of results obtained in other areas of California is also summarized. The low volume ester of 2,4-D at 2 qt./100 gal. was most economical, but where it could not be used, amino triazole at 4 lb./100 gal., or dalapon (2 lb.) + amino triazole (4 lb.) generally gave satisfactory control of these weeds. Mid- to late-season spraying was more effective than early-season treatment. —M.P.

1599† Craig, H. A. (Summarizer) and Hoyt, P. B. **Horsetail.** [2 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 30–1. [Exp. Fm, Beaverlodge, Alberta]

Topgrowth of *Equisetum arvense* can be completely controlled by spraying with 2,4,5-T(ester), 2,4-D (butyl ester) or MCPA formulations at 4 oz./ac. Least injury to a barley crop and best control of horsetail was obtained with 4 and 8 oz. MCPA/ac. after complete weed emergence and when the barley was either in the late-shot-blade or early milk stage.—From summary.

1600† Pastoral Review and Graziers' Record. **Subterranean clover to control skeleton weed.** *Pastoral Rev.* 1957, **67**, No. 5, 550.

Trials at Wagga Agricultural College, N.S.W., have shown that subterranean clover [*Trifolium subterraneum*] plays a primary role in the control of *Chondrilla juncea*. It is recommended that the clover should be sown with the wheat crops, and that 2,4-D should be applied at the correct stage. This should be followed by a heavy application of superphosphate the following autumn to encourage dense growth of the clover.—M.P.

1601 Brown, D. A. (Summarizer). **Canada thistle.** [5 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 11–13.

Results with amino triazole, 2,4-D, MCPA and MCPB for the control of *Cirsium arvense* in oats, wheat and peas are reported.—M.P.

1602† Lee, O. C. **Timing applications of amino triazole for Canada thistle control.** *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 31–2. [Agric. Exp. Sta., Lafayette, Ind.]

[See also Abs. 729.] In trials carried out during 1956, the best control of *Cirsium arvense* was obtained from spraying once with 4–6 lb. amino triazole/ac. during the period 22 May–15 June. Mowing the thistles in June and spraying 7 weeks later was also satisfactory. On land which had been cultivated in the spring, the treatments were less effective.—M.P.

1603† Tochtermann, U. Untersuchungen zur Bekämpfung der Ackerdistel *Cirsium arvense*, Scop. mit Wuchsstoffherbiziden sowie über die Wirkung der 2,4-Dichlorophenoxyessigsäure auf deren Wurzelorgane. [**Investigations on the control of creeping thistle *Cirsium arvense* with growth-regulating herbicides and the action of**

2,4,D on its roots.] *Diss. Hohenheim* 1956, pp. 82, bibl. 95, illus. [Landw. Hochschule, Hohenheim, W. Germany]

Amongst the results recorded, the susceptibility of creeping thistle to growth regulators after autumn- and spring-ploughing was found to be the same. The best time for spraying was at the bud stage. Treating the subterranean parts of the plants was no more effective than treating the aerial growth. The most effective dose of 2,4-D (Na) for root effect was 0·85–1·3 kg./ha. Split doses, applied 8 days apart, resulted in quicker shoot kill, but were no better with regard to regrowth the following year than a single dose. A second spraying of the rosettes in September was of no advantage.—From *Weed Abstr.* 6 : 853.

1604† Willard, C. J. (Summarizer). **Canada thistle (*Cirsium arvense*).** [12 abstracts] *Res. Rep. 12th N. Cent. Weed Contr. Conf.* 1955, 1–8. [Received April, 1957]

Results on the chemical control of *C. arvense* in pastures and arable land are summarized. A single application of MCPA and 2,4-D formulations each at 0·25–30 lb./ac. did not give 100% control of the thistle, but repeated treatments combined with cultivation were almost entirely successful. Under moist conditions, heavy, late-autumn applications of up to 40 lb./ac. were a failure. Two treatments with a 2,4-D ester at 8 lb./ac. after 3 cultivations apparently gave complete kill in one season. CMU gave a complete kill of thistles only at 100 lb./ac., an amount which has prevented the growth of all vegetation since 1951. Amino triazole at 8 and 20 lb./ac. gave almost 100% control. Treatment at the bud stage was generally the most effective. [See also Abs. 729 and 730.]—From summary.

1605 Sexsmith, J. J. **Cultural and cropping control of lens-podded hoary cress (*Cardaria draba* var. *repens*).** [Abstract] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 27–8. [Exp. Fm, Lethbridge, Alberta]

Hoary cress was eradicated by the end of the 3rd season of continuous fallowing with a total of 22–24 operations made to allow 4–5 days' regrowth of shoots. In crop/fallow rotations, the use of barley was slightly superior to the use of wheat. Autumn rye/fallow gave no better control of hoary cress than did spring grains/fallow. 2,4-D at 24 oz./ac. in fallow years may be useful in overcoming some of the soil-drift hazards resulting from frequent cultivation.—From summary.

1606† McCurdy, E. V. (Summarizer). **Other broad-leaved annual and biennial weeds.** [32 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 68–77.

The weed species included : *Hypochaeris radicata*, *Stellaria* spp., *Spergula arvensis*, *Senecio vulgaris*, *Polygonum* spp., *Chenopodium album*, *Salsola kali* var. *tenuifolia*, *Raphanus raphanistrum* and *Brassica arvensis*. —M.P.

1607† De Kimpe, P. Le contrôle de la jacinthe d'eau. [**Water hyacinth control.**] *Bull. agric. Congo belge* 1957, **48**, No. 1, 105–51, bibl. 37, illus.

The literature on the control of water hyacinth (*Eichhornia crassipes*) in the Congo is reviewed. The effectiveness of 2,4-D, sprayed at high pressure from shallow boats and at low pressure from canoes, was tested under commercial conditions. Applications of 2,4-D amine solutions at 0·2, 0·4, 0·6, 0·8 or 1·0% of acid equivalent were effective but the rate of destruction varied with the concentration. [See also *Herb. Abstr.* 26 : 519.]—M.H.F.

1608† Hughes, E. C. **Effect of soil sterilants on water smartweed (*Polygonum hydropiperoides*) in drainage ditches in the Fraser Valley.** [Abstract] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 78.

Diuron at 60 lb./ac. gave 98% control of *P. hydropiperoides* ; at 10–40 lb./ac., control was 80–85%. Ureabor (borate + monuron) at 0·5 and 1 lb./100 sq. ft. gave 90 and 95% control, respectively, and the monuron/2,4-D mixtures (10–40 lb. + 4–16 lb./ac., respectively,) gave 80–85%.—From abstract.

1609† Swingle, H. S. **Control of pond weeds by the use of herbivorous fishes [in the USA].** *Proc. 10th S. Weed Conf.* 1957, 11–17, bibl. 20. [Agric. Exp. Sta., Auburn, Alabama]

1610† Ivens, G. W. Colonial Pesticides Research, Arusha. **Report on arboricide experiments. February-December, 1955. Pt 2.** *Pest. Abstr. Sect. C.* 1957, **3**, No. 2, 93–109.

[See also Abs. 1161.] Trials carried out in East Africa on the control of the following are discussed : *Grewia microcarpa*, *Balanites* sp., *Lannea* spp., *Tarchonanthus camphoratus*, *Euclea divinorum*, mixed tree communities and *Solanum incanum* (Sodom apple).—M.P.

1611† Leonard, O. A. **Specific recommendations for brush control with chemicals.** *Proc. 9th Calif. Weed Conf.* 1957, 80–5. [Univ. California, Davis]

The recommendations are mainly concerned with the use of 2,4-D and 2,4,5-T formulations : as aerial applications ; in ground-rig foliage-spray applications ; as basal sprays and for the treatment of cut surfaces and stumps. The control of specific brush types such as chamise [*Adenostoma* sp.] chaparral [*Ceanothus* sp.] and mixed coastal brush

by aircraft spraying is discussed, and methods of controlling live oak [*Quercus virginiana*] and poison oak [*Toxicodendron* sp.] are also considered in detail. —M.P.

1612† Dawley, W. K. [Summarizer]. **Other perennial herbaceous weeds.** [5 abstracts] *Res. Rep. W. Sect. Nat. Weed Cttee* 1956, 32–3.

Senecio jacobaea was slowly killed by spraying with 28 oz. of 2,4-D (amine) in 30 gal. of water/ac. at the rosette stage. *Centaurea repens* growing in competition with *Bromus* sp. was controlled by DB spray and granular (borate + 2,4-D) at 2–3 lb./100 sq. ft. and 2,3,6-TBA at 10 lb./ac. Amongst the compounds effective against *Silene vulgaris* were : 2,4-D (2 lb./ac.) + polyborchlorate (2 lb./100 sq. ft.) ; polyborchlorate at 2–3 lb./100 sq. ft. ; neburon at 40 and 80 lb./ac. Mowing was superior to any chemical tested for the control of *Artemisia absinthium*.—From summary.

1613 Bartley, C. **Simazin and related triazines as herbicides.** *Agric. Chem.* 1957, **12**, No. 5, 34–6, 113–5.

Simazin, Geigy 444E (chlorazin), G-27901, G-30028 (propazin) and G-30031, all 2-chloro-4,6-alkylamino-s-triazines, were applied pre-emergence to 15 crops at 2, 4 and 8 lb. (simazin also at 0·5 and 1 lb.) in 36 gal. of water/ac. Applied at the same rate, none of the other compounds equalled simazin in its control of broadleaved and grassy weeds. Simazin, applied at 1 lb./ac., gave for 10 weeks 99% control of broadleaved weeds and 86% control of grasses such as foxtail [*Setaria* spp.], witch grass [*Panicum capillare*] and crabgrass [*Digitaria* sp.]. At the 2 lb. rate, 100 and 96% control, respectively, were obtained. Each of the other compounds, even at 2 lb./ac. gave over 90% control of broadleaved weeds for 10 weeks and were superior to sinox, CIPC and CDEA. Applied at a rate exceeding 1 lb./ac., simazin injured sorghum, wheat, cotton, peas and oats. G-30028 performed comparably with simazin and was less damaging to cotton. G-30031 was promising for weed control in maize, soyabeans, cotton and peas. Simazin was outstanding for weed control in maize which was not injured by application at 16 lb./ac. Maize plants grown in simazin-treated soil were larger and greener and gave higher yields than the plants treated with other types of herbicide. *Agropyron repens* and some broadleaved weeds were not controlled by the lower rates of simazin but both *A. repens* and *Convolvulus* sp. were controlled by the 6–8 lb./ac. rate.—J.F.C.

1614† Antognini, J. and others. **EPTC. An experimental herbicide for pre- and post-emergence application for grass and broadleaf weed control in vegetables, ornamentals, forage and agronomic crops.** *Proc. 11th N.E. Weed Contr. Conf.* 1957, 3–11. [Res. Devel. Labs, Stauffer Chem. Co.]

Data are presented on the results of greenhouse and field experiments carried out during 2 years with a new herbicide EPTC (ethyl N,N-di-n-propylthiolcarbamate). Good control was obtained of the grasses (including *Avena fatua* and *Setaria* spp.) against which it was tested. To be effective, the herbicide was applied before weed emergence, and its effect lasted for the entire growing period of a crop such as maize. Crop and weed susceptibilities to EPTC, applied at 1–10 lb./ac., are listed. Susceptible crops could be treated safely after the early seedling stage.—M.P.

1615† Fédération Nationale de Protection des Cultures, Journées Françaises d'Information. Les désherbants séléctifs et les régulateurs de croissance. [**Selective herbicides and growth regulators.**] *Féd. Nat. Prot. Cult., Jour. fr. Inform. 28–9 Nov. 1956*, Paris.

Among the subjects dealt with in the papers (more than 30) presented at this conference are : mode of action of selective herbicides ; new preparations ; application of herbicides to various crops, including maize, rice, flax, colza and sugar-beet ; control of couch grass and other grass weeds ; potato-haulm killing ; desiccation and defoliation of legumes grown for seed ; dodder control ; and toxicity.—E.B.O.

1616† Heinze, K. Blattläuse als biologischer Bekämpfungsfaktor bei der Bekämpfung von Unkräutern. [**Leaf aphids as a biological agent in the control of weeds.**] *Z. PflKrankh.* 1956, **63**, No. 12, 689–93, bibl. 9, illus. [Inst. gärtnerische Virusforsch., Berlin-Dahlem]

1617 Wiese, A. F. **Preliminary research in developing a chemical fallow farming system.** *Proc. 13th N. Cent. Weed Contr. Conf.* 1956, 34. [Texas Agric. Exp. Sta.]

Indications obtained during preliminary trials with 2,4-D, dalapon, TCA and other chemicals for the control of weeds during the fallow period between crops of wheat are discussed.—M.P.

1618 New Zealand Weed Control Conference. **Proceedings of the 9th Conference, Timaru, 1956**, pp. 139. [Received July, 1957]

The following were among the papers read : Weed problems in South Canterbury, by J. L. Symons ; Sweet briar [*Rosa eglanteria*] control, by A. R. Dingwall ; Barberry [*Berberis vulgaris*] control, by S. R. Hewitt ; Hawthorn [*Crataegus monogyna*]

control, by D. L. Johns ; Cape tulip [*Homeria collina*] in New Zealand, by D. I. Glue ; Progress in suppression of noxious weeds, by F. W. Lovett ; Recent research work with dalapon, by M. S. Foreman ; Recent work in management and control of gorse, by P. S. Ferens ; Crop desiccation trials, by W. V. Hadfield ; Brassica weed control in Southland, by T. G. Sewell ; Control of weeds in irrigation races, by R. C. Schofield ; Place of phenoxybutyric acids in New Zealand, by L. J. Matthews; The significance of formulation and its relationship to selective herbicide efficiency, by S. W. Preston and B. J. Thomson. [See also *Fld Crop Abstr* 9 : 675.]—M.H.

CROP BOTANY

1619 Steinbauer, G. P. and Frank, P. **Primary dormancy and germination requirements of seeds of certain Cruciferae.** *Proc. Ass. off. Seed Anal. N. Amer.* 1954, 176–81, bibl. 11, illus. [Michigan State Coll., East Lansing] [Received Oct., 1956]

The dormancy period for *Brassica campestris* was found to be 3 weeks and for *B. nigra* between 28 and 144 weeks. Germination of *B. campestris* was inhibited by light whereas germination of *B. nigra* was aided by it. For the 16 species studied, daily alternation between 20° and 30°C. was usually most effective and sometimes imperative for good germination. Dormancy was broken by removal of seed coats, corrosion by H_2SO_4 or by using aqueous KNO_3.—J.F.C.

1620 Fowden, L. and Wolfe, Miriam. **The protein composition of some East African seeds.** *E. Afr. agric. J.* 1957, **22,** No. 4, 207–12, bibl. 9. [Dep. Bot., Univ. Coll., London]

The amino-acid composition of the proteins present in seed of sunflower, cotton and 7 varieties of maize were examined and are recorded.—M.P.

1621† Cleveringa, C. J. Het onderzoek van plantenwortels in hun natuurlijk groeimilieu met behulp van eenvoudige middelen. [**The study of plant roots in their natural environment by means of a simple technique.**] [Reprint] *De plantenwortel in de landbouw, The Hague,* 1955, 192–8, bibl. 8, illus. [Cent. Inst. Landbouwk. Onderz., Wageningen] [Received Jan., 1957]

This technique is called " spade diagnosis " by its originator, J. Goerbing (*Neuaufbau vom Boden her,* 1947, No. 7), and consists in the simple exposure, with a flat spade, of root layers in the field, the roots being subsequently washed for examination. Studies of this nature have shown the great importance of soil structure and aeration for successful rooting. They have also shown, *inter alia,* that it is of importance for crop and grassland plants that the roots should not only penetrate to a depth of 40–80 cm., but that they should spread in a zone 8 cm. deep, instead in one of 4 cm.—G.M.R.

1622 van Lieshout, J. W. De invloed van de wortelontwikkeling op de waterhuishouding van een hoge zandgrond. **Plant root and soil moisture relationships on a sandy soil.** *Landbouwk. Tijdschr., Wageningen* 1957, **69,** No. 2, 165–79, bibl. 13, English summary. [LandbHogesch. Wageningen]

On high, poor, sandy soil with ground-water level at ± 15 m., the effect of root development in two potato varieties and one field bean variety on moisture distribution in the soil was investigated. Soil-moisture content was influenced most by the late potato variety, Gineke, and least by the bean variety. There is an indication that root activity is a more important factor in moisture distribution than root mass. A method for estimating root density would be useful in root investigations.—From author's summary.

1623† Wiersum, L. K. Problemen en methodiek van fysiologisch-ecologisch wortelonderzoek. [**Problems and methods in the physiological and ecological study of roots.**] *TNO Nieuws* 1957, **12,** No. 1, 8–11, illus. [TNO Agric. Exp. Sta. and Soil Sci. Inst., Groningen]

An account is given of the technique employed and some of the results obtained in the study of soil-pore size as a factor impeding root growth (grasses and vegetables) ; the branching density of roots as affected by nutrient concentration of the medium, the presence of soil colloids, and the use of phosphates ; and depth of rooting in relation to oxygen requirements.—G.M.R.

1624 Čaĭlahjan, M. H. and Hlopenkova, L. P. [**The role of leaves in the development of winter plants.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1957, **112,** No. 4, 774–6, bibl. 5, illus. [Timirjazev Inst. Pl. Physiol.]

Winter plants acquire the capacity to form reproductive organs only after being subjected (for a definite period) to low temperature and grown subsequently under suitable long days. Formerly it was assumed: (1) that the effects of this vernalization process was localized in the stem apices from

where the changes induced by vernalizing were transferred to new cells only by cellular division; and (2) that the vernalized apices acquire the capacity to form flowering organs by the accumulation in them of assimilates produced under long day by the leaves (of spring types as well as winter plants). It is now known that changes induced by vernalization are not localized in the growing apices where they are initiated, but are distributed to other organs of the plant, and that assimilates necessary for forming flower initials are formed in the leaves of spring or winter plants only when the vernalization phase has been passed. The authors' grafting experiments made with *Brassica napus* var. *oleifera* were designed to elucidate the role of leaves in plant development. Under conditions of the tests it is shown that generative development of an unvernalized winter scion grown in long day proceeds only after the assimilates from the leaves of the vernalized stock have been translocated to the scion.—M.H.

1625† Šain, S. S. [**The influence of the quality and quantity of light on the development of perennial and annual fodder plants.**] [Russian] *Doklady Vsesojuz. Akad. S-H Nauk* (*Proc. Lenin Acad. Agric. Sci.*) 1956, **21**, No. 12, 9–14, illus. [V. R. Williams All-Union Sci. Res. Inst. Fodders]

It is claimed that in addition to the water/air regime of the soil, other factors which affect plant development include the quality and quantity of the sun's rays. During many years the author has studied the effect of subjecting certain herbage plants to shading during (1) the early morning and evening hours (after sunrise and before sunset); and (2) mid-day. By this means the reaction of the plants to light of short and long wavelengths was observed. Under 12-hr. illumination by short radiations (i.e. treatment (1)), the plants in their first year remained until the autumn at the stage of forming short vegetative shoots (grasses) or the rosette stage (legumes). Plants under treatment (2) i.e. those receiving only long-wave radiations, developed normally with the controls. The author maintains that this effect on plant development is determined by light wavelength and not by photoperiod. Further experiments designed to study the effect on herbage spp. of shading by cover crops have shown that when a winter-rye cover crop is sown simultaneously with a herbage mixture (or even 7–14 days later) the herbage remains almost throughout a year at the stage of short-shoot formation (or rosette stage), but if the rye is sown 21–28 days after the herbage mixture then the herbage plants proceed to complete development, forming flowers and seed (as in the controls without a cover crop). The effect of light wavelength is discussed in relation to biennial plants (turnips) and to annual grasses, in which distinction is drawn between the reaction to light wavelength of oats, wheat, barley, and that of maize, millet, and Sudan grass (among others). Species of northern latitudes require light of long wavelength while species of lower latitudes require radiation with short wavelength. Finally there is a discussion of sowing methods (row and pockets) in relation to the angle of light incidence.—M.H.

1626 Koller, J. and Heinen, A. Etude sur la résistance au froid des céréales à la Station d'Essais de Chaux-des-Prés (1950–1956). [**A study on cold resistance of cereals at the Experimental Station of Chaux-des-Prés (France) (1950-6).**] *Bull. tech. Inform.* 1957, No. 116, 37–45, illus.

Chaux-des-Prés is a sub-station of the Dijon Plant Improvement Centre, established in 1949 at an altitude of 900 m. to test the resistance of winter wheats to cold conditions. Details are given of the test-frames and how they are managed to permit exposure of the seedlings to cold while protecting them against snow. The nature and installation of the necessary thermometric, hygrometric and actinometric recording apparatus are described, the recording system is outlined and details are given of the concrete frame installed for studying the reactions of soil of known water content. Temperatures of −20°C. are reached by the end of November and −30°C. are recorded in February. Seeds germinated on paper strips at Dijon are embedded in the frames to permit the development of 3–4 leaves but no secondary roots before the frosts begin. The resident observer closes the frame when snow falls only but keeps them open to the maximum extent (an exacting task and warning devices are being devised). The mortifying effects of frost are then assessed during the subsequent warm periods. Aerial and root development varies between plants and between frames and interferes with the assessment of resistance to cold, consequently, controls of known susceptibility are placed in each frame. Light frosts in November and December permit the susceptibility of the less resistant plants to be assessed while the more severe February frosts differentiate between the more resistant varieties. Frost effects vary with the suddenness and the severity of their onset and of the subsequent thaw and comparisons are sometimes complicated by the unexpected behaviour of the controls. The problem is further complicated by the availability of water from the frozen soils, especially when sunny and windy conditions desiccate the aerial portions sufficiently to cause death of the plant. This latter factor emphasizes the difference between the two conceptions, resistance to frost and resistance to winter conditions.—M.H.F.

1627 McLean, E. O. **Plant growth and uptake of nutrients as influenced by**

levels of nitrogen. *Proc. Soil Sci. Soc. Amer.* 1957, **21**, No. 2, 219–22, bibl. 6. [Arkansas Agric. Exp. Sta.]

Barley, wheat, oats, maize, sorghum, buckwheat, cotton and soyabeans were grown in gravel cultures of 0·2 Hoagland solution. Higher N-levels increased the top-growth, but root-growth was not increased in proportion and, in some cases, was decreased. Higher N-levels increased the percentages of Ca and Mg, and lowered those of P, K and Na in the whole plant.—J.F.C.

1628 CONTREIRAS, J. and others. Modificação da modalidade original do "método de Homès". Primeiros ensaios de adubação baseados nesta nova forma do método. [**Modication of Homès method. First manurial trials based on this new form of the method.**] *Agron. lusit.* 1956, **18**, No. 2, 151–66, bibl. 12, English and French summaries. [Esta. Agron. Nac., Sacavém, Portugal]

A modification of Homès method for estimating the mineral requirements of plants is proposed and results are given from 2 field trials with wheat.—From authors' summary.

1629† BALBA, A. M. **The Mitscherlich equation as applied to express the relationships between plant composition and the soil nutrients.** *Diss. Abstr.* 1956, **16**, No. 5, 838–9. [Univ. Illinois]

1630† BALBA, A. M. and BRAY, R. H. **New fields for the application of the Mitscherlich equation : 1. A quantitative measure for the relative effectiveness of nutrients.** *Soil Sci.* 1956, **82**, No. 6, 497–502, bibl. 4. [Univ. Illinois]

1631 SCHEFFER, VON F. and others. Untersuchungen über den Einfluss des Lichtes auf die P_2O_5-Aufnahme bei Keimpflanzen. [**Investigations concerning the influence of light on P_2O_5-uptake by seedlings.**] *Plant and Soil* 1957, **8**, No. 3, 194–8, bibl. 8, illus. [Inst. Agrikchem., Bodenkunde, Univ. Göttingen]

Rye and oat seedlings were grown in a nutrient solution to which labelled superphosphate was first added when the plants were 10 or 19 days old. ^{32}P was detected in the leaves after 30 min. The P-uptake was much more rapid in light than in dark and in rye than in oats.—J.F.C.

1632 SHUTTE, K. H. **The significance of micronutrients.** *Econ. Bot.* 1957, **11**, 2, 149–59, bibl. 42, illus. [Univ. Cape Town, S. Africa]

This is a review article.—G.L.S.

1633† KNUTSON, Karin E. **Flame-photometric determination of magnesium in plant material. A study of the emission of magnesium in a highly reducing oxygen-acetylene flame.** *Analyst, Lond.* 1957, **82**, No. 973, 241–254, bibl. 29, illus. [For. Res. Inst. Sweden]

The study showed that the flame-photometric determination of Mg in plant material can be carried out accurately in the region of 2–10 ppm.—From author's summary.

1634† BRADFIELD, E. G. **An improved formaldoxime method for the determination of manganese in plant material.** *Analyst, Lond.* 1957, **82**, No. 973, 254–7, bibl. 5, illus. [Res. Sta. Long Ashton, Bristol]

1635† BASTELAERE, G. R. van. Vochtbepalingen met infraroodstralers. [**Moisture-content determination with infra-red lamps.**] *Publ. 72 Droogtech. Lab. Cent. Inst. Landb. Onderz., Wageningen*, 1956, pp. 9.

In most infra-red moisture-measuring apparatus the lamps are suspended above a balance having the material on a tray at the top, and, as the material loses weight in drying, the tray rises nearer the lamp so that the rate of drying is altered and oxidation and even burning can result. The laboratory has now evolved an apparatus in which the material is stationary in a 2-lamp stand and is subsequently weighed on a 2-tray balance. The stand is described and directions for its use are given. The time required for drying 20-g. samples of material is listed : it ranges from 40 min. for fresh grass, wet hay, and clover (cut into 1- to 2-cm. lengths) to 30 min. for grass seed, 25 for wheat and 20 for oats. Large seeds should be ground.—G.M.R.

1636† REDISKE, J. H. and others. **A controlled environment growth chamber for plants.** [Contained in] *Nuclear Sci. Abstr.* 1957, **11**, No. 6A, 359. [Hanford Atomic Products, Richland, Wash.]

The growth chamber is semi-portable and can be used with soil or a nutrient solution. It is particularly well adapted for use with radio-isotopes.—From authors' abstract.

1637† DANIELSON, L. L. and BRITTINGHAM, W. H. **An electronic temperature integrator for plant physiological research.** *Pl. Physiol.* 1957, **32**, No. 2, 142–6, bibl. 4, illus. [Virginia Truck Exp. Sta., Norfolk, Va.]

The circuit, construction data, and performance of an experimental electronic temperature integrator are presented. It is portable and con-

venient for field or greenhouse use. Instrument readings may be converted to degree-hours above 0°F.—J.F.C.

1638† Trickett, E. S. and others. **Measurement of solar and artificial radiation with particular reference to agriculture and horticulture.** *J. agric. Engng Res.* 1957, **2**, No. 2, 86–110, bibl. 17, illus., French, German and Spanish summaries. [Nat. Inst. Agric. Engng, Silsoe, Beds]

Results obtained with various instruments are given and discussed. It is concluded that a selenium photocell in conjunction with an electrolytic integrator is the most effective, general-purpose instrument.—From authors' summary.

1639† Long, I. F. **Instruments for micrometerorology.** *Quart. J. roy. Meteorol. Soc.* 1957, **83**, No. 356, 202–14, bibl. 9, illus. [Rothamsted Exp. Sta., Harpenden]

1640† Bernard, E. A. Le déterminisme de l'évaporation dans la nature. Étude des aspects géophysique et écologique du problème dans le cadre du bilan énergétique. Première partie. Généralités théoriques. [**The determinism of evaporation in nature. A study of the geophysical and ecological aspects of the problem in the framework of the energy balance. 1. Theoretical generalities.**] *Ser. sci. 68 INÉAC* 1956, pp. 162, bibl. 80. [Cent. Rech. Yangambi, Belgian Congo]

1641† Beĭdeman, I. N. [**Methods of phenological observations in geobotanical studies.**] [Russian] 1954, Leningrad ; Komarov Bot. Inst. Acad. Sci. USSR, pp. 130, bibl. approx. 430, illus. [Received Feb., 1957]

Following an account of the history, objectives and problems of phenological investigations with special reference to agriculture and phytogeography, the author gives information on methods of study and the compilation of data on graphs, charts and maps.—M.H.

1642† Repp, G. and Killian, C. Recherches écologiques sur les relations entre le climat, les sols et les plantes irriguées des Oasis Sahariennes. [**Ecological investigations on the relationship between climate, soils and irrigated plants of the oases of the Sahara.**] *J. Agric. trop. et Bot. appl.* 1956, **3**, No. 3–4, 109–41, No. 5–6, 292–319, bibl. 17, illus. [Lab. Biol. et Agrol. Sahar., Beni Ounif]

This is an ecological study of a number of plants, including : wheat of the Sahara No. 6 ; barley from the USA 43/1.A.A. ; lentils from Syria and Egypt ; *Vicia faba* from Sidi Moussa ; and *Ervum ervilia*, which were grown on the outskirts of Beni Ounif on irrigated soil from November 1954. Irrigation was suspended in the middle of April. The principal aspects studied were : soil, climate, morphological characters of the plants, their water absorption, transpiration, dry-matter yields, and drought resistance.—E.B.O.

AGRICULTURAL METEOROLOGY AND CLIMATOLOGY

1643† Dionne, J. L. and others. **Agricultural meteorology. A brief literature review and bibliography.** 1956, pp. 59, bibl. 578 (classified), Ottawa ; Canada Dep. Agric. Exp. Fms Serv., 28 × 21·5 cm.

1644† Decker, W. L. **Investigation of the effects of meteorological and climatological variations on agricultural production in Missouri.** [Contained in] *Bull. 676 Missouri Agric. Exp. Sta.* 1956, 104–5.

1645† Bultot, F. Risques d'années sèches et pluvieuses au Congo belge et au Ruanda-Urundi. [**Occurrence of dry and wet years in the Belgian Congo and Ruanda-Urundi.**] *Bur. climatol. Comm. 13 INÉAC* 1957, pp. 22, bibl. 4, illus., maps.

1646† Bultot, F. Distribution conjointe de la température et de l'humidité de l'air au Congo belge. [**Combined distribution of temperature and air humidity in the Belgian Congo.**] *Bur. climatol. Comm. 14 INÉAC* 1957, pp. 15, bibl. 2, illus.

1647† Amaral, E. and Mota, F. S. Normais e variabilidade relativa das precipitações mensais. [**Normal monthly precipitations and their relative variability.**] *Bol. téc. Inst. Agron. Sul 13*, 1956, pp. 12, bibl. 19, illus., English summary. [Pelotas, Brazil]

1648† Coaldrake, J. E. and Bryan, W. W. **A rainfall map of south-eastern Queensland.** *Tech. Pap. 8 Div. Pl. Industr. CSIRO* Melbourne, 1957, pp. 15, bibl. 2, 2 maps.

1649 White, J. H. **Sprinkler irrigation in**

eastern Arkansas. *Rep. Ser. 62 Arkansas Agric. Exp. Sta.*, 1956, pp. 16, illus.

Data on annual and monthly rainfall and on the number and length of droughts are presented for 5 stations in Eastern Arkansas over various periods up to 1954. Information is given on the county acreages of crops under irrigation and on the extent and costs of sprinkler irrigation.—J.F.C.

1650† Howe, G. M. **Agro-climatic analogues within the British Commonwealth.** *Ph.D. thesis deposited in the Library, Dep. Geog. Anthropol., Univ. Coll. Wales, Aberystwyth* 1957.

In the special problems of agricultural climatology the earlier classifications of climate served only for general orientation. On the other hand, the 1948 classification of C. W. Thornthwaite incorporates both the element ' potential evapo-transpiration' , with which growth of cultivated plants is known to be closely correlated, and an elaborate assessment of the moisture factor affecting the needs and use of water by growing crops. Because of the rational approach provided by this scheme it has been used in this study for a comprehensive survey involving the classification of climatic data for approximately 1500 stations in the British Commonwealth. The climatic indices (average annual potential evapo-transpiration, moisture regions, seasonal variation of effective moisture, summer concentration of thermal efficiency) have been computed for each station, mapped on a scale consistent with the density of climatological stations in the various countries, and the resulting patterns are discussed. Because of their practical significance in giving, respectively, an approximate indication of average run-off and information on irrigation planning, maps of average annual water surplus and deficiency are also presented. A chart, in which representative stations are tabulated according to moisture index and seasonal variation of effective moisture, enables the agriculturalist to locate climatically analogous areas, make comparisons between like areas and offer assessments of agricultural possibilities in undeveloped areas. The validity of the Thornthwaite scheme is verified by testing the classification against known successful introductions of a selection of plants, viz. forage crops, cocoa, sugar-cane and tobacco. The degree of correlation between the climatic classifications of respective localities in "source" regions and "new" regions from which, and to which, successful introductions have been made, was generally satisfactory, though the limitations of the purely climatic approach to agricultural problems are demonstrated.—Author's summary.

MISCELLANEOUS

1651† Nilsson-Leissner, G. **The extent of official analysing and governmental sealing and marking of seeds in Sweden.** *Proc. internat. Seed Test. Ass.* 1956, **21**, No. 2, 129–35.

1652† Quackenbush, F. W. and others. **Inspection of agricultural seeds.** *Circ. 418 Purdue Univ. Agric. Exp. Sta.* 1955, pp. 64.

Average-analysis tables are given for seed of the main herbage- and field-crops from the 1922, '54 and '55 inspections in Indiana.—J.F.C.

1653† Turkey. Publication and Information Directorate. Technical Information Service. Tohumluk sertifikasyon talimatnamesi. **Seed certification regulation.** [Turkish] *Publ. 65 Tech. Inf. Serv. Ankara* 1956, pp. 53. [Received April, 1957]

1654† International Co-operation Administration USA and Chinese-American Joint Commission on Rural Reconstruction. **Proceedings of the Far East Seed Improvement Conference, Taiwan, June 25th-July 14th, 1956.** 1956, pp. xii + 216, illus.

1655 Zimmerman, K. Die Organisation der Sortenwertprüfung, der Sortenzulassung und der Saatenanerkennung in Ungarn. [**The organization of testing, admission and recognition of varieties in Hungary.**] *Dtsch. Landw.* 1957, **8**, No. 2, 86–90, illus.

The Hungarian system described is considered to be a model.—D.B.

1656 Prummel, J. **Fertilizer placement experiments.** *Plant and Soil* 1957, **8**, No. 3, 231–53, bibl. 18, illus. [Inst. Soil Fertil. Groningen, Neth.]

Placement of N, P and K was compared with broadcasting in more than 100 experiments carried out during 1948–55. In general, placement was better. The comparison may be expressed as the ratio, W_P/W_b, between the amounts of fertilizer giving the same yield by each method, e.g. with cereals, potatoes and beets the ratio for N is 1 : 1·2. Heavy dressings in narrow bands gave yields as high as those from broadcasting, whereas according to de Wit, whose theory of placement is discussed, the yields should be lower.—J.F.C.

1657† Miège, E. La fumure et le traitement des

plantes par pulvérisation foliaire. [**Manurial treatment of plants by leaf spraying.**] *J. Agric. trop. et Bot. appl.* 1956, **3**, No. 1–2, 1–31 and No. 3–4, 163–99, bibl. 56.
This is a review article.—E.B.O.

1658† TERMAN, G. L. **Variability in phosphorus rate and source experiments in relation to crop and yield levels.** *Agron. J.* 1957, **49**, No. 5, 271–6, bibl. 9, illus. [Soils and Fert. Res. Br., TVA, Wilson Dam, Ala]
Yields of common crops in 433 field experiments using P fertilizers in 7 southeastern states were measured during 1950–5. Legume/grass hay and small grains showed greater responses than cotton and maize.—From author's summary.

1659† EIDGENOSSISCHE LANDWIRTSCHAFTLICHE VERSUCHSANSTALT, ZÜRICH-OERLIKON. Pflanzenschutz im Feldbau. [**Plant protection in crop cultivation.**] *Mitt. schweiz. Landw.* 1957, **5**, No. 1/2, 1–48, illus.
This paper constitutes a scientifically arranged catalogue of the most important diseases and pests of cereals, potatoes, sugar-beet, rape, peas, and fodder plants, with short descriptions, notes on their occurrence and successful control measures.—D.B.

1660† ZÄCH, C. Neuere Entwicklung auf dem Gebiet der Pflanzenschutzmittel. [**Recent developments in the field of plant protection agents.**] *Schweiz. Landw. Mh.* 1957, **35**, No. 4, 233–7. [Wädenswil, Switzerland]
A short review is given of commercial fungicides and insecticides, mostly of Swiss manufacture, which have appeared since 1953.—D.B.

1661 TOMS, A. M. and GOODMAN, A. **The importance of drift in insecticide spraying experiments : some observations from insect behaviour in cotton.** *Emp. Cott. Gr. Rev.* 1957, **34**, No. 3, 177–88, bibl. 15, illus. [Sudan Gezira Board]
The possible causes of the so-called 'depletion effect' occurring in unsprayed cotton plots in experiments with insecticides are discussed. Experimental evidence seems to indicate that this effect is due primarily to spray drift from adjacent sprayed plots and not from insect migration. In view of this effect, which does not appear to be confined to experiments with cotton in the Sudan, the design of spraying experiments is discussed and suggestions made.—Authors' summary.

1662 MAYNE, J. E. **Progress in the mechanization of farming in the Colonial Territories. 3. British Territories in the East.** *Trop. Agric. Trin.*, 1956, **33**, No. 4, 272–7, bibl. 9. [Nat. Inst. Agric. Engng]
[See also *Fld Crop Abstr.* 7 : 1428 and 8 : 1425.] A study tour of the technical progress in farm mechanization in Aden, Cyprus and South-east Asia is reported.—M.P.

1663† ZIMMERMANN, K. F. Feldversuchswesen : Vereinfachtes Rechenschema für Blockversuche und lateinische Quadrate. [**Field trial methods : simplified scheme for the calculation of block trials and Latin squares.**] *Züchter* 1957, **27**, No. 2, 89–92, bibl. 4. [Inst. Vererbungs-, Züchtforsch., Humboldt-Univ., Berlin]
The scheme described consists of a simplification of the statistical work. An example is given.—M.P.

1664† GEIDEL, H. Zum Ausgleich von Bodenunterschieden bei Blockanlagen. [**Balancing soil differences in block layouts.**] *Z. Acker- u. Pflbau* 1957, **103**, No. 1, 71–82, bibl. 3.

1665† GEIDEL, H. Zur Anwendung von Gleitmittelwertverfahren bei der Auswertung von Feldversuchen. [**The application of moving averages in the evaluation of field trials.**] *Z. Acker- u. Pflbau* 1956, **102**, No. 2, 183–204, bibl. 20, illus. [Inst. Pflbau u. PflZüchtung, Justus Leibig Hochsch., Giessen, W. Germany]

1666 GEIDEL, H. Graphische Ermittlung von sukzessiven und gleitenden Mittelwerten. [**Graphic determination of successive- and moving-average values.**] *Z. Acker- u. Pflbau* 1956, **102**, No. 2, 205–8, illus. [Inst. Pflbau u. PflZüchtung, Justus Liebig Hochsch., Giessen, W. Germany]

1667† JEALOTT'S HILL RESEARCH STATION. **Guide to field experiments 1957.** Bracknell, 1957, pp. 40, illus.

REPORTS

The notes below indicate the main investigations in the report covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated.

1668 **Great Britain.** Rothamsted Experimental Station. Report for 1956. Harpenden, 1957, pp. 280, 10s.

INVESTIGATIONS REPORTED :

1. Micrometeorology. By I. F. Long, p. 37. Throughout the summer of 1956, temperature, humidity and wind measurements were made among, and above, potatoes and wheat. Five years' data, giving information about the environment of the growing plant, have now been assembled for potatoes.
2. An attempt to increase yield by controlling leaf-area index. By D. J. Watson and others, pp. 85–6. As in the previous year, the thinned plots of kale had a higher net assimilation rate than the unthinned plots, but it was only just sufficient to offset the decrease in leaf-area index [leaf-area index = leaf area per unit area of land], and both plots gave almost identical total dry-matter yields.
3. Enzymes of bracken. By R. H. Kenten, pp. 88–9. The work reported was mainly concerned with the biochemical nature of thiaminase.
4. Ley arable rotations, pp. 179–81. On Highfield, the grazed ley was the best preparation for potatoes and cut grass the worst ; on Fosters, in the absence of dung, potato yields were highest after a grazed ley ; with dung the best yield was after arable crops.
5. Maize, p. 209. In 1956, a cold, wet year, the Dutch variety Prior, sown 28 April and harvested 16 October–29 November, yielded 15 cwt. dry grain/ac., half the normal yield. There were, on average, 1·5 ears/plant.
6. Soyabeans, p. 209. The crop did not come to seed in 1956 and confirmed the conclusion that soyabeans seem to have little future in Britain. [See also Abs. 1392, 1456, 1503, 1590.]—M.P.

1669 **Great Britain.** University of Nottingham. Report of the School of Agriculture 1956. Sutton Bonington, 1957, pp. 81, illus.

INVESTIGATIONS REPORTED :

1. The effect of population densities on crop yield, p. 22. Four varieties of mangel and fodder-beet were grown at population densities of 15-, 20-, 25- and 30-thousand plants per ac. The highest root- and dry-matter yields were obtained at the highest plant density, which was obtained by singling to a distance of 10·5 in., in rows 20 in. apart. The size of the individual roots was reduced, but yield increases of *c.* 25% were obtained compared with the lowest population.
2. The transplanting of sugar-beet, pp. 23 and 52–5. [See Abs. 1430.]
3. Development of a multi-purpose crop drier, pp. 24 and 55–61. [See Abs. 1391.]—M.P.

1670 **Basutoland** Department of Agriculture. Annual Report for 1956. Maseru, [n.d.], pp. 68, illus. [Received June, 1957]

INVESTIGATIONS REPORTED :

1. Fertilizer studies, pp. 34–52. A widespread response to P was obtained from cereal crops. Responses to N were few and slight. In one trial, maize yields were significantly increased by up to 60 lb. N/ac. applied to maize sown at 18 in. or less in rows 3 ft. apart.
2. Weed control in maize, pp. 52–3. The advantage of spraying with 2,4-D was evident in the wet, early summer of 1955–6. Pre-emergence spraying with 2 pt. 2,4,-D/ac. 5 days after sowing + 1 implement cultivation, or spraying when the maize was 4–6 in. tall with 1 pt. 2,4-D/ac. + 1 implement cultivation, or one hand cultivation + 1 implement cultivation resulted in the highest maize yields, 16·1, 17·5, 16·0 bags/ac., respectively, while the untreated control yielded 2·4 bags/ac. [1 bag = 200 lb.]. Spraying without cultivation was the least effective of the treatments.
3. Crop studies, Maseru, pp. 56–9. Wheat yields were low, but all the varieties yielded more when sown on 30 May than on 27 April.—M.P.

1671 **Belgian Congo.** Institut National pour l'Étude Agronomique du Congo Belge. Rapport annuel pour l'exercice 1955. [Annual report for 1955.] Bruxelles, 1956, pp. 567, bibl.

INVESTIGATIONS REPORTED :

1. Rice. The varieties R.E.7., R.66 and R.53 outyielded the control, E.88, at Mvuazi and gave around 2000 kg./ha. of paddy, p. 274. At Gimbi, p. 295, N, P and K applications to *Urena lobata* in the previous year doubled the production of the subsequent rice crop, p. 295. The varieties R.10 and R.75 averaged at Boketa over 3000 kg./ha. over a 4-yr. period, p. 377. R.69 in a multiplication series at Kiyaka produced in a year two crops of paddy totalling 2256 kg./ha., p. 413. At Bena Longo the variety R.20 maintained its superiority (3121 kg./ha.) over the control Kinda (2651 kg./ha.), p. 428.
2. Maize. N, but not P or K fertilizers, increased grain yields at Yangambi, p. 102. Sand culture experiments indicated that, for a given anion/cation ratio, grain yields increased with the quantities of fertilizer applied for each of the ratios of 0·75, 1·0 and 1·5 but decreased when the ratio reached 2·0, p. 226. For a given application of fertilizer nutrients, the grain yield increased with

increasing ratios of anions/cations up to 1·5. The optimal ratios of N/S/P and K/Ca/Mg for root- and aerial-growth and for grain formation were determined. The superiority in grain productivity of Gan F_1, HD1158 and HD1157 maize varieties, to the local Mvuazi strain, was demonstrated at Gimbi, p. 293. Gan F_1 was also the best variety studied at Mukumari, p. 337, but at Gandajika, p. 397, several new varieties were better. In the forest areas, Kahila maize gave the largest grain returns but, on the savannah lands the variety GPS2G5 yielded best. At Kiyaka, whereas the variety Kahila maintained its position, the yield from the Kapindi variety was encouraging, e.g. 2979 kg./ha. in the valleys, and 1121 kg./ha. on the plateau, p. 412. While artificial fertilizers increased the yield of both maize and groundnuts in a maize/groundnut sequence, the increase of both crops was even more marked in a groundnut/maize rotation. The varieties Gan and GPS2, which yielded 3873 and 3567 kg./ha., respectively, proved superior to the local variety at Kibangula, p. 432. Grain yields indicated the advantage of not thinning to less than 3 plants per pocket. At Kaniama, the superiority of GPS2G5, Gan G_1, HD1158 and HD1157 hybrids was demonstrated, their grain yields being 4000, 4400, 4600 and 5500 kg./ha., respectively, compared with 3700 kg./ha. for local red maize, p. 457.

3. Groundnuts. The increased yield of nuts at Yangambi following various fungicidal treatments of the seed is summarized, p. 103. Variety A20 outyielded others (including A65) at Gimbi, p. 293, while at Kondo, p. 306, the varieties A8 and AE42 produced over 2000 kg./ha. In preliminary trials at Bambesa, p. 356, the varieties Badolo and A9 yielded better than A65, but, in a replicated comparative trial, the latter proved superior to collections 425 and 426, p. 356. At Boketa, A65 and Finzu each yielded more nuts than the local hybrid, p. 376. Experience in this last year confirmed the previous view that sowing should be carried out at the beginning of the rains with 2 seeds per pocket sown 10 cm. deep, but, at Kutubongo, yield was not affected by either the date, or the depth, of sowing, p. 385. At Magombo, p. 388, whereas A65 yielded better than 425 or 426, it gave the same returns as 62–12, A3522 and 136–33, p. 388. The varieties A10, A98 and E42 gave higher yields than either A66 or the local groundnut at Gandajika, p. 399. In trials at Lubarika, a dry-culture spacing of 0·6 × 0·05 m. produced the best results whereas, under irrigation, spacing of 0·4 × 0·05 m. and 0·4 × 0·1 m. gave the optimum yields, p. 423. In trials at this station it was also proved that sowing with two seeds gave heavier yields than sowing with one seed.

4. *Urena lobata.* If seeds were broadcast, decorticated seeds resulted in heavier fibre yields but sowing in pockets ensured a more effective occupation of the soil and the production of better stems.

5. Cotton. Bambesa 197F9 was significantly superior to Stoneville 5 in productivity of seed and lint at Bambesa, p. 354, and at Magombo, p. 387. At Gandajika the yields of seed and lint from several varieties of C2 cotton were significantly higher than those from Gar 105–162, as were also the ginning percentages and the fibre lengths, p. 391. This superiority of the C2 varieties was maintained when the seeds were sown late, in different soils and in 32 sub-stations. Field trials in Kivu and Urundi demonstrated that 1021, and 937–1471 were comparable in productivity with C2–1368, p. 421, and at Kibangula, p. 432, have again indicated the superiority of C2 varieties over Gar.

6. *Eleusine* sp. At Kiyaka, p. 413, the Kisozi type yielded 888 kg./ha. while, at Nioka, p. 496, lines 0114 and 0228 produced over 1700 kg./ha. and lines 0106 and 0309 yielded 1300 kg. grain/ha. The varieties Vuri, Lango and Omidu yielded between 1500 and 1800 kg./ha. at Mt. Hawa, p. 515.

7. Sorghum. Yields under unfavourable conditions varied from 425 to 1003 kg. grain/ha. at Nioka, p. 496, while, at Rubona, p. 524, yields were 1334 kg./ha. for ST9 and over 1200 kg./ha. for Amayenzi and ST5.

8. Barley. Yields of over 2000 kg./ha. are reported from Ndihica, p. 487, and from 2100–2600 kg./ha. from Kisozi, p. 540.

9. Yams. Varieties KO7, KO9 and KO20 produced 39, 37, and 30 tons of tubers per/ha., respectively, at Mvuazi, p. 273. Yields up to 65,588 kg./ha. have been recorded at Kiyaka, p. 414.

10. Cassava. At Gimbi, p. 292, cassava is well adapted to interplanting with maize and its yields are better during the second than in the first year after *Urena*. It preferred sloping to flat land. The varieties Amer, Dolusa and ST/Av/2 gave over 36,000 kg. of tubers/ha. at Gandajika, p. 400. In another trial at the same place, Ntolili, SO97 and Tapicuru gave over 32,000 kg./ha. At Lubarika, p. 424, the yield of tubers after 24 months was one-third greater than that at 12 months and the productivity decreased as the spacing intervals increased from 1 × 0·5, and 1 × 0·75 to 1 × 1 m. At Mt. Hawa, it appeared that the Criolinha variety should not be grown for more than 24 months and that after this interval it yielded up to 40 tons/ha., p. 516.

11. Sweet-potato. At Gimbi, p. 295, clones of C57 and C5 yielded 45,200 and 37,500 kg. of fresh tubers/ha., respectively. Field trials in Kivu, p. 474, indicated that Caroline Lee was better adapted to altitudes above 1550 m. and Mugenda to lower regions. At Nioka, Tsikunzu, Takanaka, Mulungu 46 and Caroline Lee yielded between

20,000 and 30,000 kg. fresh tubers/ha., p. 495. At Mt. Hawa, Singa Kilo, Fobe and Kandolo gave similar yields. Caroline Lee appreciably outyielded the varieties with which it was compared at Rubona, and proved to be the most productive in the swamps and on the hillslopes, p. 526. At Kisozi, p. 539, Norton Sam and Mugenda proved the most productive varieties, the former yielding best after 8 months' growth.

12. Potato. At Kaniama, p. 456, Akersegen and Alpha potatoes produced 18,137 and 17,106 kg. of tubers/ha., respectively, after 94 days. Pentland-Ace, Libertas and Sientje were the most productive varieties at Ndihira, p. 486. Compared with the productivity of Kerr's Pink, 11,666 kg./ha., at Ituri, p. 497, the tuber yields of Profijt, Libertas, Sientje and Voran were 213%, 194%, 184% and 175%, respectively, for plateau soils. In the swampy regions both Royal Kidney and Kerr's Pink gave satisfactory, but lower, yields, 7384 and 6713 kg./ha. Ysselter, 20,068 kg./ha., gave a very high tuber yield at Rubona, p. 526. At Kisozi, p. 539, the only varieties to be retained, as a result of past trials, will be Star 4 (the most resistant to *Phytophthora infestans* and bacterial wilt but with the lowest organoleptic value) and the more palatable but less blight-resistant Eigenheimer 55, Sientje and Royal Kidney.

13. Soyabeans. At Yangambi, p. 114, the early varieties Otootan, Palmetto and SH162 yielded over 1200 kg. beans/ha. but the more productive, late-maturing variety trials were complicated by soil fertility variations. SHE 81, Otootan and SHE 35 yielded about 800 kg./ha. at Gandajika, p. 400, while, at Kiyaka, p. 414, 8 Java 3334 and K92/6/2/2/3 outyielded Otootan 70 and, at Keyberg, p. 445, 34S51, SHO31 and K92/6/2/2/1 did likewise. Yields of 1046–1167 kg./ha. were obtained in two seasons at Mt. Hawa, p. 514, for several varieties while yields of up to 9000 kg. of green forage/ha. were collected in other trials. At Rubona, p. 525, bean yields of over 2000 kg./ha. were recorded in the first season for 7 varieties and up to 1976 kg./ha. in the second season.

14. Peas. At Ndihira, p. 487, yields of 1636 and 1414 kg./ha. in consecutive trials were recorded for D3 while, at Kisozi, p. 538, Servo, A27 and Kyondo lines yielded 1100, 1500 and 2500 kg./ha., respectively.—M.H.F.

1672 **Australia.** Commonwealth Scientific and Industrial Research Organization. Eighth Annual Report for the year 1955–6. Canberra, 1956, pp. 179. [Received May, 1957]

INVESTIGATIONS REPORTED :

1. Wound healing of potatoes and reaction to *Phytophthora infestans*, p. 24. [See Abs. 1471]

2. Safflower (*Carthamus tinctorius*), p. 25. In the north-west of New South Wales and on the Darling Downs it has been confirmed that safflower can equal and even exceed linseed in oil-yield and in most cases exceed wheat in monetary return. Spacing the crop in 7-in. rows again resulted in greater seed-yield/ac. and a higher oil content than in 21- or 28-in. rows.

3. Crop studies, Northern Territory, pp. 72–3. Sorghum yield was greatly influenced by atmospheric conditions during and shortly after anthesis. A change from wet to dry conditions led to a marked drop in the number of grains produced per head, but not to any marked change in grain size ; yields fell about 33%. With groundnuts the only climatic factor showing any correlation with the cessation of nut formation towards the end of the wet season was a marked drop in the nightly minimum temperatures. In a tillage experiment, marked responses were obtained in favour of deep dry-ploughing, as against shallower or later ploughing ; moisture retention and depth of penetration was greater in the deep, dry-ploughed land.—M.P.

BOOKS

1673 MINISTRY OF AGRICULTURE, FISHERIES AND FOOD. ENGLAND AND WALES. **The farm as a business. A handbook of standards and statistics for use in farm management advisory work.** 2nd edn 1957, pp. iv + 197, bibl. 102, London ; H.M. Stationery Office, 21 × 16 cm., 7s.

1674† ROWE-DUTTON, Patricia. **The mulching of vegetables.** *Tech. Comm. 24 Commonw. Bur. Hort. Plant. Crops* 1957, pp. xiv + 169, bibl. 345, illus., Farnham Royal ; Commonw. Agric. Bur., 22 × 14·5 cm., 20s.

Among the crops considered are : brassicas, peas, beans, potatoes and beets.

1675 ESCH, J. A. H., and others. **Dutch potato atlas. First supplement.** 1956, illus., Wageningen, Netherlands ; Veenman and Zonen, 22 × 16 cm., f. 7·65, 14s., $2·00, D.M. 8·50, Fr. fr. 705, Fr. belge 102.

The supplement consists of a folder containing loose-leaf pages of text and illustrations ready for insertion into the original publication. The varieties dealt with are : Climax, Majestic, Maritta, Prefect, and Tedria. They are treated in the same

way as in the original edition [see *Fld Crop Abstr.* 9 : 1038], and the style and high standard of the original edition are maintained.—D. Brown.

1676† Subbiah Mudaliar, V. T. **Common cultivated crops of South India.** 1955, pp. 606, bibl. 25, illus., Amudha Nilayam Private Ltd., 23 × 28·5 cm., Rs. 15. [Received June, 1957]

A comprehensive account is given of the principal food, fodder and commercial crops of South India. Included are 11 cereals, 9 pulses, 6 oil-seed crops, 8 fibre crops, potatoes and many plantation crops. The introductory chapters are concerned with the climate and soils of Madras and Andhra, manuring, tillage and irrigation. The book is intended for use in degree courses of the universities of South India, and is written in a clear and easy style which makes it very suitable for the non-specialist as well as for the specialist ignorant of the country.—J. F. Crespin.

1677† Crafts, A. S. [Ed.] **Annual review of plant physiology. Vol. 8,** 1957, pp. 477, California ; Annual Reviews Inc., 23 × 15 cm., $7·50.

Papers in this volume include the following : Mineral nutrition of plants. By H. G. Gauch, pp. 31–64, bibl. 205 ; Nitrogen metabolism in plants : ten years in retrospect. By F. C. Steward and J. K. Pollard, pp. 65–114, bibl. 289 ; Auxin relations in roots. By B. Åberg, pp. 153–80, bibl. 160 ; The history and physiological action of the gibberellins. By B. B. Stowe and T. Yamaki, pp. 181–216, bibl. 202 ; Drought resistance in plants and physiological processes. By W. S. Iljin, pp. 257–74, bibl. 108 ; Physiological ecology. By W. D. Billings, pp. 375–92, bibl. 147.—J.F.C.

1678† Steinhaus, E. A. and Smith, R. F. **Annual review of entomology. Vol. 2,** 1957, pp. 407, bibl. at end of chaps, illus., Palo Alto, California ; Annual Reviews, Inc., 23 × 16 cm.

Among the subjects dealt with in this volume are the following : Aerial application of insecticides. By F. E. Weick and G. A. Roth, pp. 297–318, bibl. 65 ; Cotton insects and their control in the United States. By J. C. Gaines, pp. 319–38, bibl. 132 ; Pollination of alfalfa and red clover. By G. E. Bohart, pp. 355–80, bibl. 140.—J.K.L.

1679† Milthorpe, F. L. [Ed.] **The growth of leaves. Proceedings of the Third Easter School in Agricultural Science, University of Nottingham, 1956.** 1956, pp. x + 223, bibl. at end of chaps, illus., London ; Butterworths Sci. Publ., 22 × 14 cm., 40s.

This symposium will be more valuable to students of plant growth and morphogenesis than to those of agricultural science, though it is obvious that a fuller understanding of leaf growth and its determinants must benefit the latter also. The fourteen major contributions are arranged under four headings, the first being general aspects of growth and differentiation. This is appropriately opened by F. G. Gregory with a summary and mature assessment of his studies of leaf-area growth in the cucumber. An outstanding paper is that of E. Bünning on the processes of differentiation. He presents a set of " basic rules of morphogenesis " which, though speculative, are likely to stimulate further research. Professor Bünning favours the view that differentiation is based on competition for various substances rather than on the production of inhibitors. J. K. Heyes and R. Brown complete the section with a useful summary of the earlier work of the Oxford Unit of Plant Cell Physiology. Root-tip material was used in these studies, but the data are clearly relevant to growth and cellular differentiation in leaves.

Part 2 is on the initiation of leaf primordia and begins with a chapter by C. W. Wardlaw. His approach needs no introduction, and in one place he defines the growing apex as a dynamic geometrical system giving rise to lateral members. The brief chapter by F. J. Richards develops some of the implications of such a concept and, though theoretically important, it may be doubted whether many readers of the book will have the mathematical perception to make effective use of it. N. Sunderland, J. K. Heyes and R. Brown conclude this section with a summary of their work on the shoot apex of *Lupinus albus*. This chapter supplies quantitative data for both structural and functional attributes of successive primordia and internodes at the apex. The contrasting properties of these structural entities are of outstanding interest, but it may be regretted that the elegant techniques developed were expended on material not grown under constant conditions.

Leaf expansion is the general heading of Part 3, in which there are contributions by H. Jones ; H. W. B. Barlow with C. R. Hancock ; E. Bünning; and W. T. Williams.

Part 4 is concerned with external factors and leaf growth, and the editor opens it with an examination of the relative importance of different stages of leaf growth in determining final area. He concludes that this is determined very largely by occurrences in the primordial stage. In addition to reviewing the relevant published work from his department, G. E. Blackman reports new experiments under controlled conditions, on the influence of light and temperature on leaf growth. The results are in line with the conclusions reached from the statistical analysis of seasonal variations of the variables considered. This is reassuring for, in the latter approach, there is a likelihood of

instability in the regression coefficients when correlations between the predicting variables are high. H. L. Penman's brief paper on weather and water in the growth of grass presents a novel approach to growth problems. D. J. Watson presents a useful account of the crop physiological approach to the determination of yield. His analysis in terms of such concepts as leaf-area index (L), leaf area duration (D), and net-assimilation rate (E) has undoubted value, and many interesting illustrations of their application are given. Exception can, however, be taken to the stress placed on the importance of the first of these concepts. For instance the reviewer seriously questions the usefulness of comparing mean values of L and E (see Fig. 2, p. 181) as determinants of yield. It is true that instantaneous or short-term rates of increase in dry matter can be resolved into size and rate components represented by L and E, and it is sometimes useful to determine which of these components is responsible for a treatment difference at a given time. When duration (the greater part of the life cycle in Watson's example) is brought into the picture, however, the interest shifts to the interaction of these components in time, and their comparison is further complicated by causal interdependence of the components themselves. Watson recognizes the dependence of E upon L as L increases beyond unity, but he does not seem to recognize that L is dependent upon E at all times, and particularly when L is less than unity. These considerations greatly reduce the value of Watson's analysis of yield determination, and there are reasonable grounds for questioning his conclusion that it is unlikely that agricultural yield can be improved by increasing the photosynthetic efficiency of the species at present cultivated. The foregoing detailed criticism of Dr. Watson's main conclusion would be quite out of place in a review of the symposium were it not for the fact that the editor in his preface and again in his own chapter makes it basic to the purpose of the symposium. Professor Milthorpe points to the confusion in our thinking resulting from too great an emphasis on the study of the rate and mechanism of the photosynthetic reactions. This confusion certainly exists, but it is perhaps not as serious in its consequences as he suggests. The remedy is not, of course, that we need to know less about the internal and external factors governing growth in leaves, but that such knowledge needs to be integrated in a fuller understanding of the physiology of growth in the plant as a whole. The reviewer sincerely hopes that, after an appropriate lapse of time, the same group of workers will organize a symposium on this wider theme. The book includes brief accounts of demonstrations relating to the measurement of leaf area and environmental factors, and to observations on plant growth. The publication is well produced, and the editor and others responsible for organizing the symposium are to be congratulated.—R. F. Williams.

1680† White, G. F. [Ed.] **The future of arid lands. Papers and recommendations from the International Arid Lands Meetings.** *Publ. 43 Amer. Ass. Advance. Sci.*, 1956, pp. ix + 453, bibl. at end of chaps, illus., Washington ; 23·5 × 16·5 cm.

This volume sets down the efforts of scientists from 17 countries, and from as many disciplines, to assess the state of man's struggle to make productive and stable use of the world's arid lands. Areas of meagre and undependable rainfall and of sparse vegetation commonly called "arid" account for roughly one-third of the land surface of the globe. Such lands have been greatly affected by man's use and misuse, and the margins of grazing, cropping and non-agricultural activity are shifting, unstable frontiers of occupance. Range deterioration, water exhaustion, salt accumulation and accelerated erosion are among the hazards to permanent use. The future also hinges upon ingenuity in finding new and improved ways of increasing the usefulness of these great physical expanses ; possibilities range from radical innovations in finding new water sources to patient application of principles known centuries ago. The individual papers mark a promising method of collaboration across both national and disciplinary boundaries.—From preface.

1681 Pedler, F. J. **Economic geography of West Africa.** 1955, pp. xii + 232, illus., London ; Longmans, Green and Co., 22 × 14 cm., 16s.

1682† Wellington, J. H. **Southern Africa. A geographical study. Vol. 1. Physical geography. Vol. 2. Economic and human geography.** 1955, pp. xxiv + 528 and xviii + 283, bibl. in text, illus., 8 maps, Cambridge Univ. Press, 24 × 17 cm., Vol. 1, 70s., Vol. 2, 40s. [Received July, 1957]

The dust cover heralds this book as a "monumental study . . . there is no doubt that this will be a standard reference book for economists and students of the social sciences as well." Both a random glance at the chapter- and page-headings and a more detailed reading of these two volumes substantiate this claim and extend its appeal beyond the economists and social scientists.

The area covered by "Southern Africa" is that lying south of the Congo-Zambesi watershed and includes the Union of South Africa, Basutoland, Bechuanaland, Swaziland, Southern Rhodesia, Northern Rhodesia (except the Northern Province), Nyasaland, Mozambique, Southern Angola and Madagascar. Volume 1 deals, in three parts, with:

structure and surface (principally a detailed geological study of the area) ; climate (including winds, weather, rainfall and drought), vegetation and soils (and their pastoral and/or arable value) ; hydrography (or the river systems and water resources of the area). The 32-page chapter on vegetation is devoted to a description of the main vegetational types : sclerophyll ; Karoo or desert shrub ; grassveld ; savannah ; and forests. Botanical, local English and Afrikaans names of the main plant species characterizing these types are meticulously recorded in most instances, and frequently the derivation of the Afrikaans name is given.

The main subdivisions of Volume 2 are : land utilization (with chapters on maize, wheat, animal husbandry, forestry, veld and soil conservation and land reclamation) ; mineral and other industries ; the people (mainly an historical study of the major population groups).

Love of detail is a feature of this book and not only does one realize that the author has an intimate knowledge of the areas he describes, but one is led carefully and with interest on a conducted study tour around this vast land mass. The book is generously illustrated throughout with over 100 photographs, many taken by the author himself, and over 100 sketch maps and diagrams. The bibliography is inserted as a footnote when the text requires it, and such practice is useful, but a resumé of the principal works of reference would have added greater finish to the book.

" The questions that this book deals with relate mainly to the subcontinent as a home of man. What kind of physical environment has man to reckon with in this part of Africa ?" asks the author. The answers are to be found in these two volumes, presented with all the clarity, knowledge and insight of a scientific geographer and a humanist.—M. Pennington.

NEWS ITEMS AND NOTES

Netherlands

1683† TNO Experiment Farms. In the Netherlands the general practice has been for experiment fields to be organized on private farms, and, while this ensured a variety of conditions, it did not facilitate the making of long-term investigations. The Institute for Soil Fertility at Groningen (TNO Soil Science Institute) has now acquired four experiment farms with a joint area of some 110 ha. in the newly reclaimed North-east Polder. A short account of the research in progress is given by J. A. Grootenhuis in *TNO Nieuws* 1957, 12, No. 3, 98–102, illus. Two-thirds of one farm, the Dr. H. J. Lovink Farm, are devoted to permanent experiments, most of them laid down in 1944, on crop rotations, organic manuring, the application of phosphates, and tillage, respectively. The remaining three farms are designed for long-term studies which are indicated by their names, viz. The Artificial Fertilizer Field (crop-growing without organic manures) ; Cloverland (do. with a certain amount of green manuring) ; and The Temporary Ley (for arable and grassland farming, with the use of green manure, f.y.m. and compost).—G.M.R.

1684 Irrigation with sewage water. Sprinkler irrigation has greatly increased in the Netherlands in recent years, the water being obtained from underground or from surface water. In West Germany, on the other hand, sewage- and industrial-refuse-water is often used. The many problems connected with this practice are discussed by M. M. M. van Gent in *Landbouwk. Tijdschr.* 1957, 69, No. 3, 227–36, as studied in a recent tour of West German installations. Costs, including purification, are frequently lower for the producer (municipalities, factories etc.) than in the normal disposal of sewage water, and are lower also for the farmer than the use of pure water, while a not inconsiderable amount of fertilizing matter, including trace elements, is applied in the water.—G.M.R.

USSR

1685 A. N. Bach. The issue of *Biochimija* Vol. 22, Nos. 1 and 2, 1957 commemorates the centenary of the birth (on 17 March, 1857) of A. N. Bach. This issue of 440 pages contains 55 articles (in Russian, German, French or English) among which the following are noted : (1) Nitrate-reducing systems in cotyledons and seedlings of bean seed embryos, *Vigna sesquipedalis*, during the germinating stage [in English], by F. Egami and others ; (2) Malonic acid in leguminous plants (bean, red clover, pea and vetch) [in Russian], by S. V. Soldatenkov and T. A. Mazurov.—M.H.

Japan

1686† Extensive rainmaking trials to increase the rainfall over the mountains using smoke-generators for production of silver-iodide nuclei are reported in a paper by H. Halakeyama in *Pap. Met. Geophys., Tokyo*, 1956, 8, No. 3, 327–46. Cloud seedings in the various districts of Japan are being carried out independently, but all districts claim successful results over the past 2 years. In one zone, cloud-seeding is claimed to have increased rainfall by 13%. From the island of Kyushu, however, silver-iodide smoke-generators are reported to have decreased the rainfall in summer. The deactivation of the silver iodide has been retarded by spraying it with water-vapour, H_2S or ammonia. *Discovery*, June, 1957.—M.P.

Australia

1687 The 1956 Australian Plant Nutrition Conference was held at the University of Melbourne. 72 papers

were given in 4 Sessions under the main headings : (1) Nutrient requirements of plants and diagnosis of deficiencies. (2) The distribution and role of nutrients in the plant. (3) Inter-relations of legumes, *Rhizobium* and nutrients. (4) Cultural practices and other environmental factors. Volume 1 comprises the papers presented at the Conference and Volume 2, published separately, reports the Conference discussions. The following are selected titles : Some aspects of potassium nutrition in plants, by R. G. Coleman, pp. 245–53 [see Abs. 66] ; A zinc-copper antagonism affecting cereals, by T. C. Dunne, pp. 278–83 [see Abs. 1387] ; Nitrogen and cereal quality, by A. J. Millington and J. T. Reeves, pp. 293–9 ; The effect of soil mineral nitrogen level on the nitrogen content of wheat grain and straw, by S. A. Waring, pp. 300–6 ; Relationship between soil nitrogen and the protein content of wheat in Victoria, by H. J. Sims, pp. 307–16 ; Nodulation and nutrition of tropical legumes, by D. Norris, pp. 393–401 ; Non-symbiotic nitrogen fixation and the maintenance of soil nitrogen, by C. A. Parker, pp. 421–7 ; Cultivation practices in relation to yield on a Northern Territory soil, by E. Phillis, pp. 441–9 [see Abs. 1552].—M.P.

1688† THESES FOR HIGHER DEGREES. A list is given of the titles and authors of over 80 theses on which higher degrees in Agriculture were awarded by Australian Universities during 1950–6. It is intended to publish further lists annually. *J. Aust. Inst. Agric. Sci.* June, 1957.—M.P.

British Guiana

1689† AGRICULTURAL CENSUS. In 1952, the Department of Agriculture initiated an annual census of agriculture in British Guiana, with the intention of taking a comprehensive quinquennial census from 1956 onwards. The methods used are described and the results for 1952 are discussed and tabulated in detail in *Agriculture in British Guiana* Vol. 1, No. 1, under the headings : conditions of farms and farmers ; crops ; livestock ; farm business. Subsequent numbers for 1953 and 1954 are supplementary issues to indicate the main changes which have occurred during the years under consideration, and are less detailed.—M.P.

USA

1690 COMMON NAMES OF INSECTICIDES. A complete revision of the list of common names of insecticides, compiled by the Committee on Insecticide Terminology of the Entomological Society of America, is given and supersedes the list issued in February, 1955. The new list, with additions, has been adopted for use in the Agricultural Research Service, U.S.D.A. Altogether, 99 correct names, their corresponding chemical definitions in agreement with Chemical Abstracts nomenclature, and other designations that have been used, are tabulated. *J. econ. Ent.* April, 1957. —J.F.C.

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